Forum THNS2023:
Resilient Transport for Liveable City

(NOV 20th-23rd, 2023 – ONLINE & ONSITE: PARIS, SHANGHAI)

https://thns.tongji.edu.cn/

The Forum T-H-N-S got her name from the theme of the first edition in 2008- "Transport à Haut Niveau Service" (transport of high-level service). THNS is an International Symposium on the Sustainable Development of Urban Transport Systems, jointly initiated in 2008 by Tongji University, ParisTech and the French Ministry for the Environment. During the past years, it has been supported by the Chinese Ministry of Housing, Urban Planning and Rural Construction, the Chinese Ministry of Transportation, the French Ministry for the Ecological and Solidary Transitions and many other Chinese, French and international institutions in the relevant fields.

The Forum especially fosters the East-West exchange of knowledge advances: research outcomes, innovative technologies, implementation reports etc. It brings together academics, policy makers and business representatives with expertise in urban planning and urban management, transport, public transport, rail transport, energy and the environment.

THNS2023 is co-organized by Tongji University & Ecole des Ponts ParisTech (ENPC), supported by Beijing University of Technology,Southeast University,Wuhan University of Technology,Arts et Métiers Institute of Technology,CentraleSupélec,EELISA network of technological universities in Europe,INSA Lyon,Université Polytechnique Hauts-de-France,INSA Hauts-de-France,Université Gustave Eiffel,Graz University of Technology,Aristotle University of Thessaloniki,Ecole Spéciale des Travaux Publics,URBA2000,THALES SEC Transport,AUF (L'Agence universitaire de la Francophonie),WCTRS (World Conference on Transport Research Society).

Organizer

Supported by

THNS2023 Session Details

The online sessions are arranged in 4 afternoons of Shanghai time (morning in Europe), during 20th-23rd, November, 2023.

The working language for the forum is English. (A few speeches are given in Chinese with English simultaneous interpretation).

The latest version documents of program and session details are available at the official website of THNS forum: https://THNS.tongji.edu.cn

Abstract Number: "A****S" will be presented on site, in Room A201/203, Sino-French Center, Tongji University, Shanghai

ZOOM: https://zoom.us/j/98408529302 No. 98408529302 Password: 741197
(Test session available: 16h-18h Beijing Time/9h-11h Paris Time, 17th November)

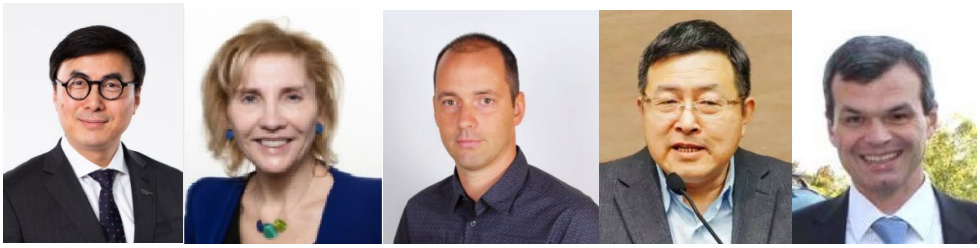
DAY 1

Opening Session

Moderators: Dr.Rémy LE BOENNEC & Dr.ZHANG Bo

Time (Shanghai): 2023-11-20 16:00 - 16:30

Time UTC+1 (Paris): 2023-11-20 09:00 - 09:30



Welcome & Orientation

LOU Yongqi, Professor, Vice President of Tongji University

Marie-Christine BERT, Vice President of International Relations and Corporate Partnerships, ENPC

Bruno BARROCA, Professor, Head of the Doctoral School on City, Transportation & Territories,ENPC

PAN Haixiao, Professor, Tongji University, Co-Chairman of THNS2023

Fabien LEURENT, Professor, ENPC, Co-Chairman of THNS2023

Group photo - screenshot and on-site

Keynote 1

Achieving Urban Sustainability and Resilience Through Transit Oriented Development.

Mobility Challenges in The City of Thessaloniki, Greece

Prof. Apostolos PAPAGIANNAKIS

Time (Shanghai): 2023-11-20 16:30 - 17:10

Time UTC+1 (Paris): 2023-11-20 09:30 - 10:10s

Transit-oriented development (TOD) is an integrated urban and transport planning approach that aims to mitigate urban sprawl and car use, enhance neighborhood livability, increase public transport use, and promote sustainable mobility and resilience. Although TOD is widely accepted by academics, planners, and policymakers, the question of how citizens acknowledge its expected benefits remains open. While TOD was developed primarily in North American cities, many interventions implemented in European cities over the past 25-30 years have adopted TOD approach as a basis for urban development and regeneration policies, aiming at the overall revitalization and improving of accessibility in the urban areas. However, in several Southern European cities the quest for an integrated spatial planning is not in the public policy agenda, as transport policies are in general fragmented without considering the cross-cutting characteristics of urban development and mobility. Cities such as Athens and Thessaloniki in Greece or Palermo in Italy that had evolved in the past as typical compact cities with high densities particularly in the city centre, have being affected for decades by underdeveloped transit, and have recently introduced or are introducing urban railways systems. Their urban structure and mobility patterns have changed drastically in the last decades because of rapid and often uncontrolled suburbanization and urban dispersion, as well as an increased transport demand. This research explores the potential for implementing TOD and investigates the citizens' perceptions of TOD potential benefits in the context of Southern European cities. Based on the case of Thessaloniki, Greece, which introduces urban rail by constructing a metro system, a TOD typology is proposed, and two pilot TOD plans are presented. The typology was based on the qualitative analysis of the urban fabric features, the residential and employment densities, and the development prospects within the stations' catchment areas. The elaboration of the pilot plans has combined a top-down with a bottom-up planning approach and proposed the neighbourhood regeneration around two future metro stations with different urban characteristics. A questionnaire survey addressed to residents contributes to explore their views and expectations regarding the future of their neighbourhood and its potential for sustainable upgrading.

The findings highlight that an integrated urban and transport planning based on a modification of TOD model could be implemented in Southern European cities, taking advantage of their compact and mixed-use features but also constraining the relatively recent phenomenon of suburban dispersion. Furthermore, citizens appreciate that TOD may offer opportunities to enhance the connectivity,

accessibility, walkability, quality of public space and neighborhood livability. Nevertheless, overcoming the multiple institutional and financing barriers is necessary to guarantee a successful transfer and adaptation of the TOD model.

Apostolos Papagiannakis is Associate Professor of Transport Systems Planning at the School of Spatial Planning and Development, Faculty of Engineering, Aristotle University of Thessaloniki (AUTh), Greece (Dipl. in Applied Mathematics, AUTh | D.E.A. des Statistiques Appliquées, Institut National Agronomique de Paris- Université Paris XI | PhD en Modélisation des transports, I.N.A. | Post-Doctorat, Université Paris IX). His research interests focus on sustainable urban mobility, integrated spatial and transport planning, urban public transport, statistical analysis of transport systems, transport demand forecasting models, transport network and land use interaction, transport projects evaluation, transport policy and multicriteria decision making. He has a long-term research, project and educational experience in Greece and in France with an emphasis on the interdisciplinary approach. He participated in many studies and European research projects in France as researcher associate and in Greece as senior consultant in collaboration with public transport organizations and engineering consultancies (Thessaloniki Urban Transport Authority, Centre Nationale de Recherche Scientifique, Regie Autonome des Transports Parisiens, Institut d'Amenagement Urbain de la Region Ile- de-France). He has also been a member of scientific committees of international and Greek conferences and journal reviewer. Is a member of the Hellenic Institute of Transportation Engineers.
apa@plandevel.auth.gr

Keynote 2: The Outlook of Yichang Electric Bus Business in Yichang City

by WANG Jinhua (in Chinese with English Interpretation)

Time (Shanghai): 2023-11-20 17:10 - 17:50

Time UTC+1 (Paris): 2023-11-20 10:10 - 10:50

WANG Jinhua, General Secretary and Manager, Automobile Repair Branch of Yi Chang Public Transport Group Co., Ltd

1.Introduction to Yichang City and its enterprises
Yichang, known as Yiling in ancient times, is located in the southwestern part of Hubei Province, where the upper and middle reaches of the Yangtze River divide. Yichang Bus Group was founded in July 1972, is a state-owned medium-sized class of passenger transport enterprises, under the Yichang City Development Investment Group Co. Ltd. It has 1,786 employees, 736 buses (978 standard buses), 84 routes, with a total route length of 1,160.48 kilometres, 1 BRT corridor, 56 BRT platforms, 11 charging stations and 629 terminals. It undertakes more than 98% of the public transport functions in the urban area, with an average daily passenger volume of about 300,000 and an annual operating mileage of about 40 million kilometers.
2.the development of electric buses overview
Actively respond to the national new energy strategy, in 2016 put 18 pure electric buses in the

beginning, update the vehicle all for new energy buses, now has a new energy bus 382, accounting for 52%. Yichang BRT trial run on 15 July 2015, the total length of the corridor is 23.9 kilometres, running through the three main urban areas of Yiling District, Yiling District, Xiling District and Wujiagang District in Yichang City, the implementation of the same direction free transfer, the system has been more than 63% of the total passenger traffic in the urban area.

3.do enough pure electric vehicle management

Firstly, focus on the model, battery and power selection; secondly, focus on vehicles and routes, passenger flow matching, maximising the utilisation of electric buses; thirdly, focus on purely electric vehicle maintenance team forging, to ensure that 100% into operation, make the best use of things, make the best use of people; fourthly, to create a vehicle management of the "Iron Triangle" Establishment of a sound "trinity" system.

Scientific planning of feeder points, hubs and terminals, planning ahead, design ahead, construction ahead; moderately ahead of the construction of electric vehicle charging infrastructure; strict implementation of the system of assessment of the remaining power of the vehicle to ensure that the single-vehicle double-shift system.

Should the situation and seek to play the pure electric vehicle operating cost advantages; due to the situation and move, the cancellation of the pure electric vehicle overhaul and three insurance, extend the mileage of the second level of maintenance; follow the trend, the implementation of the assessment mechanism; take advantage of the situation, the table against the standard, jumping to the forefront of the province's demonstration of the use of pure electric.

4. the enterprise electric bus development outlook

Actively integrate into the city's new development pattern, accurate targeting of modern urban passenger travel comprehensive service provider new positioning, built "convenient bus, safe bus, green bus, intelligent bus, civilised bus", and strive to "14th Five-Year Plan" to achieve the full coverage of new energy vehicles buses We will gradually build an all-round green power system for buses and contribute to the power of buses for the decarbonisation of urban transport.

(Machine generated translation)

演讲人：王金华，宜昌公交集团有限责任公司汽车修理分公司党支部书记，经理。他长期致力于公交车辆维保技术管理工作，具有丰富的专业技术底蕴和公交车维修经验，主持研发了“BRT进、出站无人化管理系统”“公交车用压缩天然气气瓶短程运送装置”等四项发明。主推实施了车辆维修市场化转型，在传统公交车维修的基础上，延伸拓展旅游客车、校车维修，乘用车维修服务领域，培育搭建新能源公交车辆维修保养队伍，保障了企业新能源公交车安全、稳定、有序运行。

一、宜昌市及企业简介

宜昌，古称夷陵，位于湖北省西南部、长江上中游分界处。宜昌公交集团始建于1972年7月，系国有中型一类客运企业，隶属宜昌城市发展投资集团有限公司。现有职工1786人，公交车辆736台（978标台），线路84条，线路总长1160.48公里，运营BRT 走廊1条，管理BRT站台56个，建成11个充电场站、629根个终端。承担城区 98%以上的公共交通运输功能，日均客运量约30万人次，年运营里程约4000万公里。

二、电动公交车发展概况

积极响应国家新能源战略， 2016年投放18台纯电动公交车伊始，更新车辆全部为新能源公交车，现拥有有新能源公交车382台，占比52%。宜昌BRT于2015年7月15日试运行，走廊总长度为23.9公里，贯穿宜昌市夷陵区、西陵区和伍家岗区三大主城区，实行同向免费换乘，系统内客运量已超城区总运量的63%。

三、做足纯电动车辆管理

首先着力车型、电池及电量的选配；其次着力车辆与线路、客流量的匹配，最大化发挥电动公交车的利用率；三是着力纯电动车辆的维护保养队伍的锻造，确保100%投入营运，物尽其用，人尽其才；四是打造车辆管理的“铁三角”建立健全“三位一体”体系。

科学规划接驳点，枢纽中心，首末站，规划前置，设计前置，建设前置；适度超前建设电动车充电配套

基础设施；严格执行车辆剩余电量考核的制度，确保单车双班制，

应势而谋，发挥纯电动车辆营运成本优势；因势而动，取消纯电动车辆大修和三保，延长二级维护里程；顺势而为，落实考核机制；乘势而上，对表对标，跃居纯电动的示范利用全省前列。

四、企业电动公交发展展望

积极融入城市新发展格局，精准对标现代城市客运出行综合服务商新定位， 建成“便捷公交、平安公交、绿色公交、智能公交、文明公交”，力争“十四五”末实现公交新能源车辆全覆盖，逐步打造全方位的公交绿电系统，为城市交通脱碳贡献公交力量。

Session 1: Spatial Issue

Moderators: Prof. Apostolos PAPAGIANNAKIS & Prof.TANG Yuqing

Time (Shanghai): 2023-11-20 18:10 - 19:10

Time UTC+1 (Paris): 2023-11-20 11:10 - 12:10

A0061

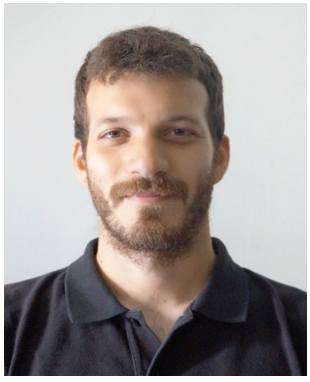
Title of Speech	**TRAMWAY IN SHARED SITES: A WAY TO MORE EASILY REDISTRIBUTE PUBLIC SPACE WITHOUT COMPROMISING THE EFFICIENCY OF THE COLLECTIVE MODE?**
Author(s)	Pierre Zembri, GuillaumeDE TILIERE
Corresponding author	Pierre Zembri pierre.zembri@enpc.fr
Key Words	**Tramway , Insertion , Performance , Share site**
Bibliography of Speaker	Guillaume de Tilière is Head of Department at EGIS (Transport Planning Studies) and Associate Professor at LVMT, University Gustave Eiffel. He is a qualified civil engineer and transport engineer, as a graduate of the Swiss

	Federal Institute of Technology in Lausanne (EPFL, 1997). Holding a PhD from the Institute of Transport of the EPFL (2002) partly studied at the University of Berkeley (California 2002-2002), he has 25 years of experience inthe field of transport research & studies. Initially involved in European projects from 1998-2002, he was then involved in projects in France, Switzerland and internationally. He has been working on projects for Public Transport Authorities, Regional Councils or Governments on strategic studies for the development of transport networks. He has a vast field of expertise: functional studies, railway operation, definition of operating programmes and financial assessment of projects, link between transport & urbanism. He is involved in research and lectures in the main transport courses at Gustave Eiffel University. He also lectured at EPFL (1998-2016); ENPC (2012-2020) As a transport all-rounder, Guillaume DE TILIERE is a Project Manager and Design Director with an extremely comprehensive field of expertise, developing a strategic vision of projects, and a valuable aid to decision making. Pierre Zembry is Professor at the LVMT Laboratory, University Gustave Eiffel since 2013. Doctor in geography (1993) and qualified to supervise research (2007). He was director of UMR LVMT from 2013 to 2023 and co-founder and director of the online magazine geotransports. He is Vice-President of the Geographic Sciences and Environment section of the Committee for Historical and Scientific Work (CTHS) and has been Treasurer of the French National Committee of Geography (2008 – 2016) They are both specialists in transport planning and the relation between transport & urbanism, and the assessment of transport network operation and performance.
Abstract	1) Introduction It may seem counterintuitive to study solutions for implementing guided urban transport that do not require the reservation of space for their sole benefit, while the rare literature on the subject (Oillo, 2020; Nau, 2018) teaches us that the greater the degree of protection against other uses, the better the performance will be. However, the redistribution of public space for the benefit of public transport and active modes can lead to trade-offs that do not necessarily prove to be optimal, such as tram-

	bike cohabitation (CEREMA, 2014). A dispassionate approach to the unmarked site or shared site combining tramway and automobile traffic can lead to consuming less public space while preserving the priority of public transport over individual automobiles, easing road traffic and reducing implementation costs. In certain cases this also makes variations possible, in the case of limited space and available areas. It also responds to a challenge of mobilizing public space greater than the pre-pandemic situation, while not compromising the performance of the most capacity mode. Methodology Our work initially consisted of an analysis of the literature on the issue of shared sites, highlighting the advantages and disadvantages of the latter in relation to their situation and their design. If they are most often established under the regime of constraint in the French context (too small width of available right-of-way for example), we note that their implementation is more common and accepted on networks which are nevertheless considered as exemplary in terms of tramway in Switzerland (Zurich, Basel) as in Germany (Fribourg im Breisgau, Stuttgart, Berlin etc.) or in Australia (Melbourne). The question is that of the conditions which make this choice possible, and therefore of the limits which must not be crossed otherwise the performance of the guided mode will be degraded. We then carried out an analysis of the different scenarios, in particular the conditions of entry and exit from the shared site, the treatment of intersections, interactions with other users of the public space, local residents, etc. The positioning and treatment of the stations constituted an important point of our investigations. The analysis of the limits concerned several points: the volume of acceptable road traffic, the treatment of intersections, the length of the shared site, etc. It was based on simulations implementing different scenarios. 2) Main results obtained or expected: The work carried out aims to better inform Urban Transport designers of the possibility of considering the shared site on certain sections, subject to compliance with the conditions that we have worked to formulate. Among these conditions, the volume of road traffic, the speeds used, the length of the shared site, the layout of stations and traffic light intersections. The separation of active mode flows from the shared site also constitutes an

	element to be taken into consideration, the creation of the unmarked site making it possible to create a dedicated traffic lane and to avoid problematic cohabitation, or even risks such as the engagement of bicycle wheels in the grooves of the tram rails. 3) Main bibliographical references CEREMA (2012), Circulation des tramways en site banal, rapport de phase 1. CEREMA (2014), Interactions vélos / tramways dans les réseaux français, rapport d'études, Direction territoriale Méditerranée, 296 p. CEREMA, STRMTG (2018), Tramway dans la circulation générale, fiche « Insertion urbaine des transports collectifs de surface », 16 p. Nau O. (2018), L'insertion des tramways en milieu urbain, entre desserte, vitesse et régularité, in-Gardon S., Quarante années de tramways en France, Lyon. Oillo B. (2020), La performance opérationnelle des systèmes de transport collectif en milieu urbain : définition et approche méthodologique, Thèse, Université Paris-Est.

A0007

Title of Speech	**BUILDING NEW STREET CLASSIFICATION SCENARIOS TOWARDS ACTIVE TRANSPORTATION EQUITY**
Author(s)	Efthimios Bakogiannis, StefanosTsigdinos
Corresponding author	Stefanos Tsigdinos stef.tsigdinos@gmail.com
Photo of speaker	
Key Words	**Active transportation equity , Sustainable mobility , Scenario planning , Athens , Spatial analysis**
Bibliography of Speaker	Dr. Stefanos Tsigdinos is a Rural and Surveying Engineer (MEng) and an Urban Planner (MSc) (NTUA). He received his PhD in Urban Mobility Planning and Transport

	Geography from NTUA. As a research assistant at NTUA, he has participated in several projects related to sustainable urban mobility and integrated urban and transport planning. He is now a Postdoctoral Research at NTUA working on transport geography, transport policy, accessibility, equity, and future mobility issues.
Abstract	Active transport modes have been gaining popularity in the recent years, a fact attributed not only to the benefits of walking and cycling in the quality of life, but also because these modes can shape the proper conditions for building sustainable transportation systems. To this purpose, sustainable mobility schemes promoting active modes are now at the forefront. Nevertheless, some of these schemes, despite their good intentions, fail to adequately consider equity perspectives. Transport equity is a crucial aspect of creating a just city and a concept closely related to social inclusion. In this regard, schemes embracing transport equity principles should encompass policies, interventions and services that ensure inclusivity within the transportation system. This study builds new street classification scenarios with the aim to improve active transportation equity, i.e., the opportunity of vulnerable users like pedestrians, people with disabilities or cyclists to have fair access to urban street space tailored to their needs. In detail, this paper builds four different scenarios that redress the street classification in a municipality within a metropolitan area: in particular, Kallithea in Athens, Greece. These scenarios are developed according to a distinct methodology which puts effort both on organisational and spatial aspects. New street categories reallocating street space to active modes users emerge . These categories (e.g., shared space, active mobility boulevard, etc.) differentiate from the conventional mobility practice through considering vulnerable users as the centrepiece of the road space. The evaluation is carried out by utilising the well-known measures of Gini index and Lorenz curves that are calculated for each scenario. Based on the results, scenarios that propose new main and local centres as well as a readable street classification with traffic calming zones determined by ring roads seem to equitably accommodate vulnerable users' activity. More specifically, the preferred scenario is called "New street

	classification determining new urban centres". This signifies, that alternative planning perspectives might be favourable to active modes, promoting a shift towards sustainability. In general, measuring the impact of integrated mobility scenarios through the lens of equity is critical for improving the quality of life in cities. Notably, a potential absence of relevant urban infrastructure could lead to social exclusion and limited human rights. Therefore, equitable scenarios re-allocating road space should be prioritised in the future. This research could inspire new research attempts on how integrated mobility planning affects transport equity, enriching the scientific debate. Finally, knowing about the impacts on equity would be of great value to policy makers, planners, consultants and local administrators who can consider these outcomes when developing new policy measures and interventions.

A0131

Title of Speech	**REFLECTION AND RECONSTRUCTION OF LOGICAL FRAMEWORK OF COMPREHENSIVE TRANSPORTATION PLANNING IN THE TERRITORIAL SPATIAL PLANNING SYSTEM FROM THE PERSPECTIVE OF RESILIENCE**
Author(s)	Jining Zhang, Duanqiang Zhai, YanyunMao
Corresponding author	Yanyun Mao 2231394@tongji.edu.cn
Photo of speaker	
Key Words	**Territorial space planning , Comprehensive transportation planning , Logical framework , Transportation resilience , Urban resilience**

Bibliography of Speaker	Yanyun Mao, Male, Postgraduate Student at Urban Mobility Institute, Tongji University, Shanghai, China
Abstract	Resilience enhancement is the key to the transformation of traditional urban comprehensive transportation planning and the realization of dynamic balance of security. Resilience theory provides a new perspective for constructing the logical framework of comprehensive transportation planning in the new era. The article analyzes the shortcomings of traditional comprehensive transportation planning. From the perspective ofresilience, the article specifically addresses the issues of risk management, spatial quality, and infrastructure in the old framework. Finally, a new logical framework for "overall resilience, emergency resilience, and service resilience" in the comprehensive transportation planning of territorial space is extracted. Through the supplement and integration of the traditional transportation planning system, the new comprehensive transportation planning framework cooperates with the spatial planning at all levels. It provides planning solutions for transportation infrastructure and risk management in emergencies. It also meets the individual travel needs of residents under the guidance of humanism. To sum up, the new framework can meet the resilience requirements of land and space planning for infrastructure projects, spatial functions and social organizations in the new era.

Session 2: Energy and Eco-transition
Moderators: Dr. Thierno AW & Dr. MA Yining

Time (Shanghai): 2023-11-20 19:10 - 20:10

Time UTC+1 (Paris): 2023-11-20 12:10 - 13:10

A0108

Title of Speech	**EVALUATION OF THE CURRENT SUPPLY AND DEMAND OF URBAN PUBLIC CHARGING STATIONS AND OPTIMIZATION SUGGESTIONS IN SHANGHAI**
Author(s)	Luyao WANG
Corresponding	Luyao WANG
author	Thnnnly@163.com
Photo of speaker	
Key Words	**Low-carbon transportation , public charging station , accessibility analysis , upply and demand balance**
Bibliography of Speaker	Luyao Wang received the B.S. degree in Urban Planning from Shandong Jianzhu University, Jinan, China, in 2021. She is currently working toward the M.S. degree in Urban Planning with the College of Architecture & Urban Planning, Tongji University, Shanghai, China. Her research interests include Urban Transportation and Infrastructure Planning, Sustainable Development and Urban Development Strategy.

Abstract	Under the global consensus on green and sustainable development represented by "carbon neutrality", new energy vehicles have been widely supported and promoted, becoming the main guide for the development of the automotive industry in the future, which has a positive impact on reducing the dependence on fossil fuels for transportation, lowering greenhouse gas emissions, and promoting the green development of the society. Therefore, in this context, it is crucial to optimize the layout of public charging piles to improve the low-carbon private travel environment. In this paper, taking Shanghai as an example, the total number of charging piles of each charging station and the usage of charging stations are analyzed by SPSS correlation, and according to the results, it is known that there is a significant positive correlation between the two. And on this basis, taking diversified city data, by using sDNA, UNA, APH and other analytical methods to analyze the supply-demand relationship between electric private vehicles and public charging piles at different times of the day on weekdays and weekends.
	Spatial visualization of overall usage, time-of-day usage, usage rate, accessibility and penetration is used to find the areas where public charging piles are lacking in Shanghai. Considering the charging scale, charging tariffs, total number of poi and population density, we propose to renovate the existing stations and add new stations to further improve the environment for the development of transportation and energy infrastructures.

A0126

Title of Speech	**ENERGY TRANSITION STRATEGIES IN DAKAR TRANSPORT SYSTEM FOR SUSTAINABLE URBAN MOBILITY**
Author(s)	Amath NDIAYE, Khadim CISSE, Thierno BirahimAW
Corresponding author	Khadim CISSE khadim.cisse@cetud.sn

Photo of speaker	
Key Words	**Energy , Transition , Transport , Sustainable**
Bibliography of Speaker	Author #1: Thierno Birahim AW, PhD Thierno Birahim AW holds a PhD in Transport Economics from the Ecole Nationale des Ponts et Chaussées - Université Paris Est. He has 19 years of professional experience in the field of transport and mobility in urban and regional environments. He has been in charge of conducting complex studies and research for the public and private sectors, analysing and presenting strategic recommendations, and assisting public authorities in the implementation of their projects. This work includes regular interactions with public decision-makers, managers and operational teams. Since 2016, he is the Director General of the Executive Council for Sustainable Urban Transport (CETUD) and, currently,

	President of AAUMA. #2: Khadim CISSE, Eng. Khadim CISSE is a civil engineer specialising in transport, urban mobility and development. He has 15 years of experience in transport. First, he was a senior transport engineer at NOVEC Consulting Engineers in Morocco. In 2017, he joined the Executive Council for Sustainable Urban Transport (CETUD) where he is currently Director of Studies and Strategy. In this capacity, he contributes to the development of urban mobility policies and strategies in Dakar and pilots several major projects such as the Global Restructuring of the Dakar Public Transport Network and the Sustainable Urban Mobility Plans (SUMP) of the Dakar and Mbour agglomeration. #3: Amath NDIAYE, Eng. Amath NDIAYE is a statistician and economist engineer with 10 years of experience in strategic planning and data management. Since 2018, he has joined the Executive Council for Sustainable Urban Transport, as Head of the Mobility Observatory Division. He has contributed to the development of urban mobility policies, in particular Sustainable Urban Mobility Plans, and low-carbon, climate-resilient development strategy for Senegal by 2050. He has led several studies, including one on the negative externalities of transport in Dakar.
Abstract	Senegal is characterised by dynamic urban development with strong demographic pressure and high population density in the cities (expected to double by 2050). The Dakar conurbation is developing rapidly and concentrates almost a quarter of the national population and half of the urban population, in a small proportion of the national territory (0.3%). According to demographic projections, this population, currently 4 million inhabitants, will reach 7 million by 2040, with a motorised travel demand. If current trends continue, there will be an average of almost 15 million trips per day by 2040, compared with 7 million in 2015. These trips generate negative externalities estimated now at 1.4 billion euros in annual economic losses due to automobile pollution, congestion, road unsafety and noise. The commitments made by the Senegalese government through its nationally determined contribution to reducing greenhouse gas emissions is encouraging a paradigm change guided by the requirements of ecological transition. The process towards an energy transition is materialising

	through the development and promotion of green mobility systems, in particular three major projects in Dakar: the new Regional Express Train (hybrid electric-diesel system, in service since January 2022), the Bus Rapid Transit (100% electric, under construction) and the restructuration of the public bus transport network in Dakar (CNG-Euro VI and electric buses). The two latter projects will permit to avoid more than 110,000 tons of CO2 emissions annually. Similarly, Dakar's Sustainable Urban Mobility Plan (SUMP) provides for the construction of seven new mass public transport lines by 2035. This plan aims, among other ambitions, to implement a real energy transition policy in transport systems and to contribute to the transformation of urban centers into sustainable cities by promoting TODs. On the other hand, CETUD (the urban mobility organizing authority) is carrying out feasibility studies to explore new renewable energy sectors, like biogas, to improve the energy mix in Senegal urban transports. To support this change, the Senegalese authorities must adopt a global energy transition strategy, including the adaptation of the legal and institutional framework, and control of the energy value chain: production, infrastructures for energy distribution and vehicle charging. Financing is also acentral issue and constitutes a major challenge to overcome for a successful energy transition.

A0135

Title of Speech	**DESIGNING A EUROPEAN MODEL FOR EV CHARGING SERVICES: TECHNOLOGICAL COEXISTENCE AS A LEVER FOR A EUROPEAN UNION-WIDE TRANSITION TOWARD ELECTROMOBILITY**
Author(s)	Anne Guillemot, AnneGuillemot
Corresponding author	Anne Guillemot anne.guillemot@enpc.fr
Key Words	**Electromobility , Electric vehicle charging , Transition , European Union**
Bibliography of Speaker	Anne Guillemot is a post-doctoral researcher at Ecole des Ponts ParisTech. Her research addresses the transformation of the transport sector in the face of the

	climate change challenge employing a range of qualitative methods. She has mainly focused on the shift toward electromobility at the European Union scale and the development of electric vehicle charging infrastructure and services. Her work falls within the field of sustainability transition research, drawing insights from innovation studies, public policy analysis and organisation studies.
Abstract	Since the early 2010s, the European Union (EU) has striven to phase out petrol-based automobility and has actively supported the development of alternative fuel options. Notably, the EU has placed a strong emphasis on advancing electric vehicles (EVs) and electromobility. The transition toward electromobility at the EU scale implies the establishment of a new, comprehensive socio-technical system, incorporating both technological and non-technical innovations integrated within a novel institutional framework. Key components include the development of EV charging infrastructure and services, involving a variety of stakeholders, and entailing new user practices as regards “refueling”. Such a far-reaching transformation is assumed to be uncertain and open-ended, because different actors may disagree about the most desirable innovations, whether it concerns technologies, market organisation or business models, and they may seek to shape the transformation according to their (conflicting) interests. Besides, resistance to change may emerge at multiple levels. This paper aims to unravel the technological trajectory of the emerging EV charging sub-system being developed throughout the European Union as part of the larger shift toward electromobility. We depart from previous approaches that viewed the EU as a collection of national settings with varying approaches to EV charging infrastructure and services, and which focused on efforts to reduce variety across borders through standardization and harmonization. Rather, we observe the momentum and debates unfolding in pan-European arenas, involving businesses and policymakers working toward establishing a consistent, EU-wide charging offer right from the outset. Based on a longitudinal, qualitative investigation spanning from 2011 to 2019, we delve into the rationale and expectations that fueled the development of an ambitious technological approach as

	shaped by a burgeoning EU-wide electromobility cluster: the electromobility hub solution. We also provide an interpretation of why a comprehensive, single-technology approach could not be universally imposed, and technological variety has prevailed instead, including contractless payment solutions and peer-to-peer roaming. Our analysis investigates the contextual structures, whether sectoral or geographical, that account for the different technological approaches and the prevailing status quo. Leaning on the concept of institutional work, we introduce the concept of 'institutional journey' to frame the process through which various technologies gain legitimacy, depending on a set of actors, actions, and the technology fit-or-stretch with regard to user practices and established institutions within the automobile sector. Our study demonstrates that the coexistence of various technological approaches is both a key characteristic and a driver of EU-wide transition toward electromobility, fostering the engagement of users, businesses, and policymakers alike. This paper makes a significant contribution to the research on sustainability transitions at the European Union scale, an issue that has thus far been largely overlooked by the research community.

Keynote 3: Hearty City and Urbanimmunology by Prof. Junyi ZHANG

Time (Shanghai): 2023-11-21 15:20 - 16:00

Time UTC+1 (Paris): 2023-11-21 08:20 - 09:00

Personal profile： Before coming back to China in April 2023, he worked/lived in Japan for more than 30 years. Currently, he is chair professor at the School of Transportation, Southeast University, China, a foreign fellow of The Engineering Academy of Japan, and a world top 2% scientist. He is specialized at transportation-centered interdisciplinary research, covering urban and regional planning, environment and energy, health, and tourism. He has published more than 500 papers in journals such as Transportation Research Part A/B/C/D/E, Journal of Transport Geography, Transportation, Tourism Management, Annals of Tourism Research, Energy Policy, Energy, Science of the Total Environment, Climate Change, and Nature sub-journals. His research was awarded as Best Paper Prizes (8) and Outstanding Paper Awards (4) for 12 times by international conferences and journals. He has been serving as a reviewer for several ten SCI/SSCI journals and as an editorial board member or associate editor for more than ten internationally well-recognized journals. He was the editor-in-chief of the journal “Asian Transport Studies (ATS)” of EASTS (Eastern Asia Society for Transportation Studies), which is the largest transportation association in the Asian and Pacific region, in 2011-2016, and a board member of the International Association for Travel Behaviour Research (IATBR) in 2016-2019. Currently, he is the co-chair of WCTRS (World Conference on Transport Research Society) COVID-19 Task Force (from 2020-present), a member of Scientific Committee of World Transportation Convention (WTC).

Abstract: The speaker argues that future cities should be transformed into a HEARTY city. 'H' refers to healthy city, 'E' to energy-saving city or eco-city, 'A' to AI-driven city, 'R' to resilient city, 'T' to tourism city, and 'Y' to yearning city. For realizing such a hearty city, innovative theories are required. In response to such requirement, the speaker proposes a discipline 'Urbanimmunology', which is a new discipline to understand the capacities that a city can protect itself by resisting to disruptions and adapt to disruptions, and to develop responses that can help the city to enhance its immunity level and consequently, to evolve into a resilient system. From the discipline

'Urbanimmunology', a DIRECT approach is derived, where 'D' means detect, 'I' indicates inform/intervene, 'R' refers to react, 'E' means enlighten/enforce/evaluate, 'C' indicates collaborate, and 'T' refers to transfer. The DIRECT approach can be used to manage the whole policymaking process towards the HEARTY city. A case study is introduced with respect to how to make use of the DIRECT approach to manage the carbon reduction and resource circulation processes. Finally, discussions are given to the positioning of HEARTY city in future urban development.

Session 3: Mobility Behaviors
Moderators: Dr. Jimmy ARMOOGUM & Dr. Philip Kofi ALIMO

Time (Shanghai): 2023-11-21 16:00 - 17:50

Time UTC+1 (Paris): 2023-11-21 09:00 - 10:50

A0005

Title of Speech	**A STUDY ON PRESCHOOL CHILDREN'S WALKING BEHAVIOR BASED ON CHILD DEVELOPMENT PSYCHOLOGY**
Author(s)	Huizhao Tu, JitingZhang(Speaker)
Corresponding author	Huizhao Tu huizhaotu@tongji.edu.cn
Key Words	**CHILDREN'S WALKING BEHAVIOR , CHILDREN'S DEVELOPMENTAL PSYCHOLOGY , SAFE ROAD FOR CHILDREN**
Photo of Speaker	
Bibliography of Speaker	Zhang Jiting received the College of Architecture and Urban Planning from Tongji University, Shanghai, China, in 2006, and the M.S. degree in Urban Planning from Tongji University, Shanghai, China, in 2009. She is currently working toward the Ph.D. degree in Road and Airport Engineering with the College of Transportation Engineering, Tongji University, Shanghai, China. Her research interests include urban landscape, childhood travel experience and physical activity in the built environment of children.

Abstract	Road traffic accidents have long been one of the leading causes of injury and death among children, and pedestrian accidents account for 45% of child road traffic injuries. In recent years, legislation, road safety education for children and changes in the traffic environment have been continuously promoted, but the number of child road accident victims and their proportion of the national total have increased, and the main causes of accidents have not changed. This is because the characteristics of children's own physical development, cognitive development and behavioural ability are the fundamental reasons for some high frequency pedestrian traffic accidents. Therefore, looking at the pedestrian traffic environment from a child's perspective may help to clarify the above puzzles. Research on the pedestrian behaviour of adults or adolescents is usually conducted from the perspective of a third party. However, when the research object is pre-school children with immature mental development, it is difficult to obtain the motivation behind the phenomenon of children's walking traffic behaviour by using the above research methods.Therefore, this study uses a head-mounted camera to investigate the specific concerns of children in the process of walking from the first-person perspective to understand what factors in the walking environment affect pre-school children. In analysing children's behaviour, this study used journey maps in service design to visualise preschool children's experiences of walking and to identify the key contacts that the walking environment triggered in children's responses, as well as children's feelings, motivations and problems with these contacts. By statistically summarising the relationship between environmental contact and children's behaviour, and the explanation of children's developmental psychology on behaviour, we can find the most valuable contact and inevitable contact in walking environment, thus explaining the inevitability of common traffic safety hidden dangers of walking children. Compared with the previous research methods, the research perspective of this paper is more microscopic and respects the rights of children as immature people. By freezing the scenes of "environment-children's perception-children's cognition-children's behaviour-results" when potential safety hazards occur, relevant personnel have the opportunity to find more ways and methods to protect children.

	Looking at the environment from a child's point of view, eliminating hidden dangers in the existing traffic environment, designing traffic information in a way that children can perceive, and striving to create a traffic environment that can protect children's safety can significantly reduce child road traffic injuries.

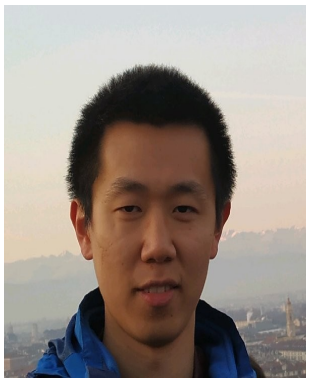
A0064

Title of Speech	**BRIDGING HOME CARE SERVICE AND FEMALE MIGRANT LABOR BY ELECTRICAL TWO-WHEELS**
Author(s)	Haixiao Pan, XiyinDeng(Speaker)
Corresponding author	Haixiao Pan hxpank@online.sh.cn
Photo of speaker	
Key Words	**Home care , Electric two wheels , Long-term care nursing staff , Female migrant laborers**

Bibliography of Speaker	Xinyin Deng is a graduate student at the College of Urban and Architecture, Tongji University. She presented the paper "How to Be Sustainable Internet Celebrity Cities from the Perspective of Word Frequency Analysis" as the first author at the 16th International Conference on China Urban Planning (IACP) in 2022, where it was included in the conference's abstract collection. Additionally, she co-authored the paper "Reflection on Building Pandemic-Resilient Urban Transport," which was also presented and included in the abstract collection of the same conference. In 2022, Ms. Deng presented her first-authored paper titled "Research on Optimizing Electric Two-Wheeled Travel for Female Migrant Caregivers to Support Home Care Services" at the World Transport Convention (WTC), where it received inclusion in the abstract collection. In 2023, she will present the paper "How does Multiscale Metro Network-wide Attributes Impact on Peak Hour Station Passenger and Flow Balancing?" as the third author at the World Transport Convention (WTC), which will be included in the conference proceedings. Furthermore, as the first author, Ms. Deng will present the paper "Research on Long-term Care Insurance Services and Travel Characteristics Under the Deep Aging of Cities" at the 17th International Conference on China Urban Planning (IACP) in 2023, and it will also be included in the abstract collection.
Abstract	At present, the aging phenomenon is serious in China. According to the seventh population census, the population aged 60 and above in China accounts for 18.7% of the total population, including a considerable number of disabled elderly people. Although there are a variety of

	models to deal with how to live after retirement, it is difficult to provide traditional home care for old people due to the miniaturization of family size and the diversity of employment options for the next generation, so a new model of home care sprung up. China has implemented various policies and planning measures to address the growing demand for home care, such as the "Guidance on Expanding the Pilot Program of Long-term Care Insurance System". This study aims to investigate the effectiveness of these initiatives through a comprehensive approach, including literature surveys, questionnaire interviews, and statistical analyses. In-depth interviews will be conducted with 200 individuals, including representatives from the Shanghai Medical Insurance Bureau, elderly care institutions, long-term care insurance elderly caregivers, service recipients, and nursing experts, to examine the organizational mode of long-term care insurance, the factors influencing the spatial matching between service providers and the demand groups, as well as the travel mode and efficiency of elderly care workers. Initial findings indicate that 90.3% of long-term care insurance caregivers are female migrant workers who face high work intensity, with an average daily working time of up to 9 hours. These caregivers are required to provide timely one-hour services for each family. They will provide the service to several families to get a reasonable income to support their living in Shanghai and support their family. As a result, 98% of caregivers prefer using electric two-wheeled vehicles as their primary commuting tool due to their flexibility, convenience, cost-effectiveness, and time-saving advantages over other transportation modes. To further enhance the service, the study also analyzes the characteristics of travel and the neighborhood-built environment in relation to electric two-wheel vehicle usage. Based on these findings, recommendations will be proposed to improve electrical two-wheel travel, aiming to facilitate efficient and effective service delivery.

A0044

Title of Speech	**IS COMMUTING A DAILY BEHAVIOR? RHYTHMIC EVIDENCE FROM FRANCE, 2019**
Author(s)	Fabien Leurent, KangLIANG
Corresponding author	Kang LIANG kang.liang@enpc.fr
Photo of speaker	
Key Words	**commuting cycle , monthly frequency , commuting rhythm , average commuting distance**
Bibliography of Speaker	I am currently a Ph.D. student at the laboratory CIRED of Ecole des Ponts ParisTech. My research concerns using statistical methods to study human behavior issues regarding mobility, from a geographical perspective. I did my undergraduate study in geographical science at Wuhan University, China. I obtained my master's degree in urban planning and transportation from Ecole des Ponts ParisTech, France, in 2020.
Abstract	To most workers, the working routine involves a fixed work place to which they go most of their worked days on a daily basis, i.e., involving a commuting trip on the morning and back to home on the evening. Yet, short home-to-work (H2W) distance may come with going back home around noon, yielding bi-daily commuting. Moreover, at the other end of the spectrum, there are long-range commuters that stay more than one day close to their working place: to these “overnighters”, the commuting cycle relative to home is multi-day instead of mono-day. Then, the frequency of commuting cycle is a supra-daily one and the commuting frequency of interest is the number of such cycles over a long period, say one month, yielding monthly frequency. Our study addresses the following research questions: What are the commuting rhythms in terms of cycle length and monthly frequency among the population of workers? What are the main rhythmic patterns of commuting, with what respective shares? How do the

	rhythmic patterns depend on individual attributes? How do they relate to travel impedance in terms of not only H2W distance but also H2W travel time and the related monthly budgets? Answers are provided for the French population as of 2019, based on the national household travel survey "EMP 2019". At the individual level the survey is a twofold one that deals first with daily mobility and then with long-range mobility. Long-range commuting practice (i.e., euclidean H2W distance above 80km) fall in the latter part, whereas short-range commuting can be revealed from the former part. It comes out that there are 96% of short-range commuters versus 4% of long-range ones. Among short-range, 84% commute once per worked day and 16% twice per day, making bi-daily commuters. About one half of long-range commuters have mono-day cycles, yet with heterogenous frequencies deviating from an average value of about 10 days per month. Among the other half of long-range commuters, i.e., overnighters, the commuting cycle length is evenly distributed from 2 to 6 days, with average value of 3.5 days; the related monthly frequencies are heterogenous, too, around average value of 4 cycles per month. The commuting rhythms exert straightforward influences on travelled distances and, depending on the transportation mode, on the energy consumption and carbon emissions of home-to-work mobility. We provide statistical indicators to calculate the modal traffics and environmental impacts on an average working day basis.

A0066

Title of Speech	**UNDERSTANDING PATIENTS HETEROGENEITY IN HEALTHCARE TRAVEL AND HOSPITAL CHOICE - A LATENT CLASS ANALYSIS WITH COVARIATES**
Author(s)	Zhilin Xie, Haixiao Pan, YaGao
Corresponding author	Ya Gao gaoya@tongji.edu.cn

Photo of speaker	
Key Words	**Healthcare travel , hospital choice , latent cluster analysis , heterogeneity**
Bibliography of Speaker	Ya Gao is a Ph.D. candidate at Tongji University. Her research focuses on travel behaviour analysis, travel demand modelling, and land use and transportation interaction.
Abstract	Access to health care is key to well-being, and it is increasingly clear that aggregated accessibility analysis is hard to reflect people's actual healthcare behaviour. This paper employs a patient-based healthcare travel survey to obtain a nuanced picture of how healthcare travel varies across patients. The existing literature shows transportation is an essential factor in accessing health care; however, most studies focus on separate healthcare travel mode choices or hospital choices for certain segments of patients, making it difficult to derive clear profiles of patients. Also, the attitudinal factors in healthcare travel have long been neglected. This research explores the joint hospital choice and travel behaviour of patients. We conducted an online survey with patients in Shanghai to identify the heterogeneity in healthcare travel behaviour and hospital choice. A latent class model with covariates is adopted to identify different patient types that exhibited distinct hospital choices and healthcare travel behaviour. Attitudinal factors are included in our model to form clear-separated clusters. Four categories of patients are identified: public transit patients, car-oriented patients, near-hospital patients, and non-downtown hospital patients, which differ in sociodemographic characteristics, healthcare-seeking behaviour, and public transit accessibility. Our research shows that a substantial share of non-downtown hospital patients should not be

	underestimated in healthcare travel demand analysis. The behaviour of public transit and non-downtown patients requires improvement of quality and public transit accessibility in non-downtown tertiary hospitals. Our study contributes to a better understanding of the market segments of patients and tailored healthcare and transport policies to meet patient healthcare travel demand.

A0110

Title of Speech	**MODELLING MOTORCYCLE CRASH RISK FACTORS USING THE MOTORCYCLE RIDER BEHAVIOUR QUESTIONNAIRE IN OUAGADOUGOU -BURKINA FASO.**
Author(s)	Augustus Ababio-Donkor, SamiPalenfo
Corresponding author	Augustus Ababio-Donkor ababioh@gmail.com
Key Words	**Motorcycle Rider Behavior Questionnaire; Principal Component Analysis; Exploratory Factor Analysis; Confirmatory Factor Analysis**
Bibliography of Speaker	It is my distinct pleasure to introduce Mr. Sami Clement Palenfo, currently pursuing an MSc. in Transportation Engineering at TRECK, located at the esteemed Kwame Nkrumah University of Science and Technology (KNUST). Mr. Palenfo's academic journey has been marked by a commitment to excellence, with a strong focus on civil engineering. Holding a bachelor's degree in Civil Engineering from Kaya Polytechnical University in Burkina Faso, Mr. Palenfo has demonstrated a robust grasp of fundamental principles within the field. His educational background has equipped him with a solid foundation in various critical aspects of civil engineering, road safety and traffic demand modelling. Throughout his academic odyssey, Mr. Palenfo has received comprehensive training in civil engineering, road safety and traffic demand modelling, further enhancing his expertise in these areas. A remarkable achievement in his academic career is his distinction as the first Francophone and Burkinabe recipient of the World Bank scholarship to pursue studies at TRECK, a testament to his dedication and outstanding potential. He will graciously share his valuable insights on

	his work, which delves into the modeling of motorcycle crash risk factors using the Motorcycle Rider Behavior Questionnaire in Ouagadougou, Burkina Faso.
Abstract	In Ouagadougou, Burkina Faso, Motorcycle accidents pose a significant risk to road safety. This study employs MRBQ to examine the critical topic of risk variables for motorcycle crashes in Ouagadougou. This study is significant because it has the potential to improve road safety in an area where motorbikes account for a sizable component of the transportation network. Insightful information can be gathered to guide policy and intervention measures by examining the connections between rider behavior and crash occurrences. The main goals of this study are to determine relevant MRBQ items from the 43 items created by Elliot et al. (2007) for improving road safety among motorcycle riders in Burkina Faso, identify MRBQ behaviours linked to increased motorcycle crash risk. The majority of participants (56.5%) fell within the youth age range of 19-25, while 42.9% reported riding experience between 6-10 years. Only 42.6% of the participants admitted to possessing a riding license. Surprisingly, 50.5% had been involved in an accident during the past twelvemonths before the interview, and 58% had been arrested for traffic offense for the past twelve months. Measurement model creation involved the utilization of both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Principal Component Analysis (PCA) with varimax rotations reduced the five-factor structure of the original MRBQ to four factors using a composite score, which factors accounted for 61.44% of the total variance. Stunt/safety factor 1 included 10 variables and accounted for 19.29% of the variance. Ten traffic error variables made up Factor 2 (Traffic Error), which accounted for 18.18% of the variation. Nine speed violation-related items made up Factor 3 (Speed violation), accounted for 14.75% of the variation. Factor 4 (Control error) included five control error-related variables and accounted for 9.24% of the variance. The CFA was used to validate the underlying four factors and structures within the data. Six variables did not align with any specific factor during the analysis Generalized linear modeling indicated that, after adjusting for variables such as gender, age, rider category, bike usage

	purpose, riding experience, possession of a riding license, and annual mileage, the primary predictor of crash risk was the stunt-safety factor followed by gender, bike usage purpose and possession of a riding license at the significant level of 0.05 with p-values (p-0.0260;p- 0.019; p-0.01; p-0.003) respectively. Intriguingly, the MRBQ questionnaire performed differently among Burkinabe motorcycle riders than it did among British riders. The findings underscore the need to address these factors to effectively reduce motorcycle crash rates and associated injuries.

Session 4: Shared Mobility

Moderators: Prof. Laurent GUIHERY & Prof. LIU Bing

Time (Shanghai): 2023-11-21 18:10 - 19:30

Time UTC+1 (Paris): 2023-11-21 11:10 - 12:30

A0049

Title of Speech	**THE IMPACT OF RAIL TRANSIT ON LAND USE CHANGES CONSIDERING SPATIAL HETEROGENEITY OF RAIL TRANSIT ACCESSIBILITY IN A BIKE-SHARING CONTEXT**
Author(s)	ZHOU Xingang
Corresponding author	zxg@tongji.edu.cn
Photo of speaker	
Key Words	**rail transit accessibility , rail transit , land use**
Bibliography of Speaker	Dr. Xingang Zhou is an associate professor and doctoral supervisor of the Department of Urban Planning, School of Architecture and Urban Planning, Tongji University. He has

	won the Shanghai Pujiang Talent Program. He is an honorary researcher of the High Density and Healthy City Research Center of the University of Hong Kong, member of the Big Data Committee of the China Urban Science Research Association. He got his PhD degree in the Department of Urban Planning and Design, The University of Hong Kong. He works on the application of big data and geographic information technology in transportation planning and urban planning, as well as the research and practice of intelligent planning. He has undertaken many projects such as the National Natural Science Foundation of China, Shanghai Pujiang Talent Fund, and sub-projects of the 14th Five-Year Plan Key Project.
Abstract	The integration of urban rail transit in guiding land use has been adopted as a crucial approach for fostering compact development. Proximity to rail transit stations can increase the probability of land use change, while existing literature has not analyzed the spatial heterogeneity of the impact of urban rail transit on land uses. This study proposes a distance decay function of bike-sharing to delimitate the spatial heterogeneity of rail transit accessibility and examines the effects of rail transit on land use changes. The rail transit lines in Jiading New Town, Shanghai are selected as the case study. Spatiotemporal big data, which provides in-depth data sets based on location services, is used to conduct research on intermodal trips. The public bike-sharing data is utilized to delimitate the spatial heterogeneity of accessibility to rail transit stations. The distance-decay function associated with cycle-metro trips is found to conform to a compound power exponential function, achieving high fitting accuracy (97%). The vector-based land use data for the years 2014 and 2019 are utilized to analyze land use changes. The vector-based cellular automata model, which can accurately simulate urban land use at the land parcel level, is applied in the land use simulation. By utilizing non-linear distance-decay function to delimitate rail transit accessibility as a driving factor for training neural networks in vector-based cellular automata model, an improvement in simulation accuracy is achieved compared to the model using a linear distance decay function. The significance of this study lies in the generality of the optimized land use vector-based cellular

	automata model considering the spatial heterogeneity of rail transit accessibility, which could also be applied to bus station and road accessibility.

A0052

Title of Speech	**THE NONLINEAR AND SPATIAL EFFECTS OF THE BUILT ENVIRONMENT ON SHARED BIKE USAGE**
Author(s)	Mi Diao, KeSong(speaker)
Corresponding author	Mi Diao diaomi@tongji.edu.cn
Photo of speaker	
Key Words	**Dockless shared bikes , Non-linear effects , Spatial effects , Built environment**
Bibliography of Speaker	Ke Song is a master's student in the Department of Urban Planning at Tongji University under the supervision of Prof. Mi Diao. His research interests include emerging mobility and spatiotemporal human behavior. His current research projects focus on the spatiotemporal patterns of shared bicycle usage and its determinants and the environmental implications of shared bicycles.
Abstract	Shared bikes are widely considered an environment friendly mode of transport that can play a substantial role in meeting the demand for travel and fostering sustainable development. Understanding the intricate and diverse impacts of the built environment (BE) on shared bike usage is crucial for policymakers and urban planners as they manage this emerging mobility option and strive to create bike-friendly cities. Numerous studies have examined the relationship between BE and shared bike usage. Recent

	research has delved deeper into understanding the complexity of this connection, exploring both the spatial variations and the non-linearity of the BE effect using methods such as geographically weighted regressions (GWR) and data-driven machine learning (ML) models. While models based on linear assumptions, such as GWR, could produce easily interpretable results and unveil the spatial heterogeneity of the BE effect, they often fall short in capturing the non-linear relationships. On the other hand, ML models excel at identifying non-linear patterns, but they encounter challenges in model interpretation and discerning the spatial effects. Models that effectively reveal both the non-linear and spatial effects of the BE on shared bike usage are still lacking. To address this gap in the literature, we combine a machine learning model, eXtreme Gradient Boosting (XGBoost), and a local model-agnostic method, SHapley Additive exPlanations (SHAP), to explore the non-linear and spatially-varying associations between dockless shared bike system (DLBS) usage and BE attributes in Shanghai, China. As a local interpretation method based on the game theory, SHAP offer the opportunity to interpret the results of ML models and visualize complex geographical phenomena and processes. In this study, we compute a group of indicators at the grid cell level, spanning the conventional 5-D dimensions to measure BE: density, diversity, design, distance to transit, and destination accessibility. We find that density- and road-network-design-related variables exhibit the most positive influence on DLBS usage among the BE factors and their effects show significant variations across space and different levels of BE measurement. Specifically, density-related factors exert a stronger positive effect on DLBS usage in downtown Shanghai, while road-network-design-related factors have a greater impact in the suburban areas. Moreover, the BE effects also display evident non-linear features. For instance, DLBS usage and floor area ratio (FAR) demonstrate an inverted “U”-shaped relationship, with ridership initially increasing with FAR until reaching a threshold value of around 2 and then starting to decrease. Additionally, DLBS usage experiences a substantial growth with population density before leveling off at around 9,000 people/km^2. The construction of new roads facilitates the usage of shared bikes, but

	when road network density reaches approximately 13 km/km², its effect becomes marginal and ceases to increase. Based on these findings, we apply cluster analysis to identify five clusters of grid cells with similar patterns in the BE-shared bike connection. We propose policy recommendations tailored to the dominant BE factor in alternative clusters to promote the shared bike usage effectively.

A0099

Title of Speech	**EXPLORING THE IMPACTS OF INTEGRATION MODE CONSIDERING RIDESHARING WITH SHARED AUTONOMOUS VEHICLES AND METRO TRANSFER**
Author(s)	Meiting Tu, XinranChen(Speaker)
Corresponding author	Meiting Tu meitingtu@tongji.edu.cn
Photo of speaker	
Key Words	**Integration mode , Ridesharing with shared autonomous vehicles , Metro transfer , Bi-objective optimization , Improved NSGAII algorithm**
Bibliography of Speaker	Xinran Chen, born in Chongqing, China in 2002, is currently a senior undergraduate at the School of Transportation and Logistics, Southwest Jiaotong University, Chengdu City, Sichuan Province. She will go to the School of Traffic Engineering, Tongji University for postgraduate, studying under researcher Meiting Tu. During the undergraduate period, under the guidance of Professor Luo Xia, she strived for projects concerning car-sharing, which included Research on Car-sharing Scheduling Optimization from the Perspective of Carbon Emission Reduction" sponsored by

	the Beijing Environment Foundation for Young Talents (BEFYT), and "Research on Car-sharing Travel Behavior Based on Multi-source Big Data" sponsored by SRTP foundation of Southwest Jiaotong University.
Abstract	Abstract: Maas (Mobility as a Service) serves as a platform that integrates urban transportation resources to offer door-to-door services. For the metro service, the existing transfer modes, such as bus, ride-hailing, and bike-sharing have the defects of long waiting time and low comfort. Shared Autonomous Vehicles (SAVs) are expected to make up for the above shortcomings, better solving the “last mile” problem, thus promoting the development and implementation of Maas services. In this paper, a two-stage decision support optimization framework is presented for the problem of the integration efficiency of metro and SAV. Firstly, based on the operational characteristics and relationship between SAV and metro, we propose three integration modes, Walk& Subway& SAV, SAV& Subway& Walk, and SAV& Subway& SAV. Taking into account the continuous dynamics of real-life passenger travel requests, the concept of refreshing time is introduced to decompose the dynamic SAV ride-splitting problem into a series of static problems in the rolling time domain. An SAV ride-sharing model considering the angle between paths is established, aiming to minimize the number of SAV vehicles and the total travel distance. Next, an improved two-stage algorithm is designed to solve the multi-objective problem. In the first stage, k-means++ clustering is applied based on the direction angles of orders to narrow down the scope of the solution. In the second stage, an improved NSGA-II algorithm based on the Large Neighborhood Search (LNS) operator is proposed to obtain stable global optimal solutions. Moreover, we validate the algorithm's results using the publicly available Solomon benchmark dataset, which confirms its consistency with known international optimal solutions. In our experiments, we utilize the order data of Ridesharing in Chengdu and analyze the advantages of the integrated mode from a spatio-temporal perspective. The results demonstrate that the integrated travel model proposed in this study achieves a higher shared ride rate (70.44%) and occupancy rate (73.60%) than traditional shared rides. It also saves an

	average of 19.40 seconds per person in travel time during peak hours, reduces vehicle usage by 64.27%, travel costs by 84.91%, and carbon emissions by 87.91%. Furthermore, regarding the temporal dimension, the integrated mode outperforms the conventional mode in various metrics during peak hours compared to off-peak hours. In the spatial dimension, the integrated mode reduces travel costs and carbon emissions for longer travel distances. The algorithm proposed in this paper can be extended to other integration problems concerning public transportation and SAV, providing scientific and reliable theoretical references and technical support for integrating travel modes in future driving scenarios. Keywords: Integration mode, Ridesharing with shared autonomous vehicles, Metro transfer, Bi-objective optimization, Improved NSGAII algorithm

A0101

Title of Speech	**A TRAVEL TIME PREDICTION MODEL FOR AN INFORMAL BUS SERVICE: THE CASE OF TROTRO IN KUMASI**
Author(s)	Kenneth Tutu, Augustus Ababio-Donkor, Williams Ackaah, Atinuke Adebanji, Charles Adams, GeorgeUkam
Corresponding author	George Ukam georgeukam@gmail.com
Photo of speaker	
Key Words	**Paratransit , Travel Time , Informal Transport , Regression Model**
Bibliography of Speaker	Brief Profile: Engr. George Stephen Ukam Engr. George Stephen Ukam is currently a Ph.D. Candidate at the Regional Transport Research and Education Center Kumasi (TRECK), Kwame Nkrumah University of Science and

	Technology (KNUST) Ghana. He is an academic staff in the department of Civil Engineering at Cross River University Calabar, Nigeria. He holds a Master's degree in Transport Engineering and Planning from the London South Bank University. Engr. George Stephen Ukam is a licensed Civil Engineer, a registered member of the Nigeria Society of Engineers (NSE) and the Nigeria Institution of Civil Engineers (NICE). His research interest borders around public transport, sustainable urban mobility, transport planning and traffic engineering. He is passionate about research and development of sustainable transport solutions for African cities and mentoring the next generation of highway and transport professionals. He is married with two lovely boys.
Abstract	Public transport in most sub-Saharan African cities and indeed cities of the global south is largely informal, what is popularly referred to as paratransit. They comprise different vehicle types with carrying capacities varying from 2 for motorcycles to about 50 for big buses, with minibus taxis with carrying capacities of between 10 and 20 being very popular. Paratransit operations are markedly distinct from formal bus services, which are popular in developed countries. They do not run on schedules or headways; they stop on demand along the route, not on dedicated stops, and on routes that are semi-fixed. The nature and operation of paratransit breed more uncertainty in travel times. This increases the anxiety associated with such trips, poor user experiences, and the reported unreliability of the service. Providing travel information has proven useful in easing the anxiety and improving user experiences associated with transit trips for formal bus services and has been recommended for paratransit. However, to provide travel time information or introduce interventions along the roadway that can help improve paratransit travel times and service quality, there is a need to model travel time for the trips. This study, therefore, focused on modelling travel time for the service in order to predict trip times in a manner that can be relied upon in providing information to the users. A regression-based model was proposed for predicting the travel time of paratransit (minibus referred to as trotro in Ghana) in Kumasi. In the modelling scheme, the route was divided

	into links to include the adjacent intersection type, and the factors affecting link travel times were explored in building the model so that the prediction for the entire route becomes the sum of the individual predictions for each link. The proposed model was tested on a 'real' trotro route, in which data was collected using an onboard travel time survey with the aid of a mobile app. The performance of the model was assessed using the root mean squared error (RMSE) and the mean absolute percentage error (MAPE). The results show that the prediction error for segments was within a minute and the prediction accuracy was about 77%. This study results provide an approach that can be used to estimate the paratransit travel times using a floating car for trip planning and scheduling. Transport planners and public transport operators can use this approach to scheduling paratransit in Low and Middle Income countries.

Session 5: Infrastructure and Resilience
Moderators: Prof. Yu-Jun CUI & Prof. SHEN Boyang

Time (Shanghai): 2023-11-21 16:00 - 17:50

Time UTC+1 (Paris): 2023-11-21 09:00 - 10:50

A0067

Title of Speech	**FATIGUE ANALYSIS OF A MOORING CHAIN FOR A FLOATING OFFSHORE WIND TURBINE**
Author(s)	Ndèye Maty Ndoye, Aliou BadaraCAMARA
Corresponding author	Aliou Badara CAMARA abcamara@ept.sn

Photo of speaker	
Key Words	**Mooring chain , Fatigue , Corrosion , Stud link chain , Finite Element**
Bibliography of Speaker	Dr. Aliou Badara CAMARA has over 7 years' experience in Civil Engineering. Currently, Aliou Badara is a Lecturer-Researcher at Ecole Polytechnique de Thiès (https://ept.sn/), focusing on Calculation of Structures and Metallic Construction. He spent 8 years in France where he completed his Engineering training and his doctorate. He worked as a communication officer for the Senegalese association of Clermont-Ferrand in 2017. He is multilingual, fluently speaking Soninke, Wolof, Bambara, French, English and lives by his motto "I rise by uplifting others". Aliou Badara holds a Master and a doctorate in Material Sciences and Engineering and a Civil Engineering degree. After obtaining his doctorate in 2019, he worked as a Civil Engineer consultant in nuclear power at EDF (Energie de France). He spent two years at EDF as team manager. In 2021, Aliou Badara CAMARA returns to Senegal where he currently works as Lecturer-Researcher. He has written some scientific articles and is interested in education because it's the key to any kind of development. Dr. CAMARA is an alumnus of the Mandela Washington Fellowship. His placement was Bridgewater State University (BSU) in Leadership in Public Management tract.
Abstract	Mooring chains are key elements for floating platforms. They connect floating structures (floating offshore wind turbines, ships, etc.) to their foundations on the seabed, which serve as anchors. The failure of these components can be catastrophic in terms of economic and environmental impacts. However, mooring faults regularly occur much earlier than expected in their useful life, with almost 50% of reported faults occurring within the first

	three years of a 20 year useful life due generally to fatigue failure. This article deals with the fatigue analysis of a mooring chain for a floating offshore wind turbine. The chain must be able to withstand the various loads applied to it and must allow the floating structure to hold its position. The mooring chain, dimensioned according to DNV standards is submitted to the effects of temperature, marine growth, corrosion but also and mostly the dynamic load due to waves. All effects cited above are applied simultaneously on the mooring chain and wear it down throughout its life. In this article, only the uniaxial fatigue effect of the dynamic load on the mooring chain is studied using DNV Standards. A stud link chain is used for this study. A finite element analysis of the stud link chain is carried out using ANSYS software in order to have a better mapping of the stresses on the mooring chain structure. The stress state is then used to assess the fatigue damage and the fatigue life of the mooring chain submitted to dynamic load due to waves.

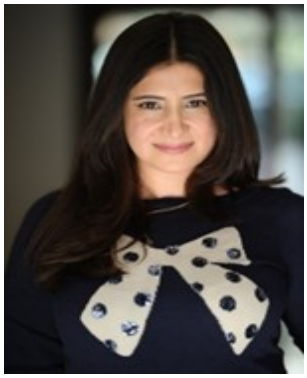
A0006

Title of Speech	**HERON: AN INTEGRATED AUTOMATED SYSTEM TO PERFORM MAINTENANCE AND UPGRADING ROADWORKS**
Author(s)	Ilias Gkotsis, Aggelos Aggelis, Leonidas Perlepes, Antonis Kostaridis
Corresponding author	Ilias Gkotsis i.gkotsis@satways.net
Photos	
Key Words	**maintenance , intervention , inspections , roadworks**
Bibliography of Speaker	Ilias Gkotsis (M), Senior Project Manager, holds a Dipl.-Ing. in Mechanical and Aeronautics Engineering from University

	of Patras and an MSc in Energy Production and Management from the National Technical University of Athens, Greece. He has over 10 years of experience in the energy, transportation, and security sector, through the implementation of R&D projects, technical studies, and educational courses. His R&D topics of interest include critical infrastructure protection and resilience, protection of public spaces, civil protection, crisis management, UAS (being also a certified pilot by HCAA/EASA) and counter-UAS solutions, traffic modelling and transport network management, energy, and environmental impacts. Over the last years, he is heavily involved (Coordinator, WP/Task leader, Dissemination leader, Security Advisory Board, Use case manager, etc.) in EU and Nationally Funded R&D projects (HEU, H2020, FP7, DG ECHO, CIPS, ISF, NSRF, etc.), in various activities such as project management, analysis of end user requirements, technical specifications definition, identification of KPIs, stakeholder engagement, system evaluation and demonstration, exercises organization and implementation, lessons learned and best practices definition and capitalization. Currently he is a project manager in SATWAYS Ltd (company developing Security and Public Safety solutions).
Abstract	At a time of zero tolerance (zero accidents, zero operating restrictions, zero ice on our roads, etc.), it is increasingly necessary to control risks and to improve the knowledge of road operators with regards to the condition of structures in order to organise preventive and predictive maintenance that minimises risks at an acceptable cost. HERON project aims to develop an integrated automated system to perform maintenance and upgrading roadworks, such as sealing cracks, patching potholes, asphalt rejuvenation, autonomous replacement of CUD elements and painting markings, but also supporting the pre/post-intervention phase including visual inspections and dispensing and removing traffic cones in an automated and controlled manner. Thus, the HERON system consists of UGV actuators that perform various maintenance actions, embedded sensors on UGV and UAV platforms capturing visual information, autonomous robotic system for maintenance missions, secure data communication enabling information flow among components, middleware

	& data fusion components enabling interaction among subsystems, and sensing interface & AI to perform object detection and semantic segmentation of the road infrastructure. All these are integrated and offered to the operators through an incidence management & decision support system, enhanced with AR capabilities, providing extended situation awareness. Through this system, HERON grant users real-time information stream during road maintenance and road inspection operations, supporting the reduction of fatal accidents, maintenance costs, traffic disruptions, thus increasing the network capacity and efficiency. The aforementioned components and the HERON solution as a whole, will be tested, validated and evaluated, with respect to the infrastructure operators' expectations and respective KPIs. The HERON's system is expected to a) improve the cost of maintenance activities, by reducing mainly the re-quired human resources, b) reduce the time period of road/lane closures and the relevant road users' annoyance, c) minimise personnel's exposure to risks both due to maintenance activities and adjacent traffic, d) minimise environmental pollution and ensure sustainability.

A0021

Title of Speech	**ARTIFICIAL INTELLIGENCE ENHANCING SEISMIC RESILIENCE OF BRIDGES**
Author(s)	NisrineMakhoul
Corresponding author	Nisrine Makhoul nmakhoul@estp-paris.eu
Photos	
Key Words	**Artificial Intelligence**

Bibliography of Speaker	Nisrine Makhoul I am currently an Associate Professor, and Research Team Leader « Smart, Sustainable, and Resilient Cities » at École Spéciale des Travaux Publics, du Bâtiment et de l'Industrie, ESTP Paris, at Campus de Dijon. I earned a Ph.D. in 2010 from « Ecole Nationale Supérieure d'Arts et Métiers, ENSAM – Paris», and I hold a Research Master from ENSAM – Paris, and a Civil Engineering Masters from the Lebanese University. I was an Assistant Professor at the University of Balamand and Lecturer at Notre Dame

	University – Louaize, where my research focused on earthquake loss estimations and resilient cities as well as structural performance, ambient noise vibrations, and modal analysis. Moreover, during those 10 years, I have acquired great experience in teaching, and in the supervision of diploma projects and thesis. I led several research projects at a local level and jointly with France (BIRG, CNRS-L, AUF/CNRS-L, SSHN, O-LIFE), and I was involved with several research groups at the European level (COST TU1406, TU1402). I was visiting researcher in Mines – ParisTech, University of Grenoble – Alpes, and IFSTTAR, and a Seal of Excellence Fellow at Politecnico di Milano, Italy, where my research focus was on Resilience Management and Data quality of Structural Health Monitoring systems. I am an honorific Resilience Fellow at the 4TU.Resilience Engineering Center and I collaborate with the University of Twente on researching the resilience of monitoring systems. I am the chairman of the IABSE research group TG1.8 «Design Requirements for Infrastructure Resilience», and a core member of the IABSE Commission 1. In December 2016, I received the « Franco-Lebanese Scientific Excellence Award of the Society of the Members of the Legion of Honor » for my career which focused on helping society.
Abstract	Bridges are essential infrastructure linking various diverse critical infrastructures and cities. Therefore, it is necessary to ensure the functionality of bridge infrastructure and to assess the seismic resilience aiming to help their rapid recovery throughout earthquakes events. This article herein concentrates on increasing bridge resilience by selecting the best estimation of the drift ratio of the bridge while subject to seismic ground motion. The drift ratio can be primarily caused by the passage of the seismic wave, the loss of coherence, and the variability in local soil conditions. To obtain the best estimation of the drift ratio, an artificial intelligence approach is used. Since several machine-learning algorithms (MLA) are available, therefore, choosing the more suitable one to the task at hand is challenging. The roadmap suggested by (Boumédiène Derras & Makhoul, 2022) is followed in this study as it offers the most suitable MLA to investigate the seismic resilience of bridges. A set of the needed data is

	generated. This dataset comprises the metadata i.e., the explanatory factors, for instance, intensity measures of the ground-motion, earthquake magnitude, the soil class where the bridge is located, and structural parameters (SP). The considered SP can be the displacement ductility capacity, the target drift ratio, etc. The optimum model requirement is to describe best the drift ratio. In this article, the forecast value of the drift ratio, is considered as the bridge's performance level (PL). This PL can be use in a further step in the classification of infrastructure resilience.

A0058

Title of Speech	**EVALUATING THE EFFECT OF CRUDE PALM OIL FROM CONGO ON THE PROPERTIES OF WASTE TONER-MODIFIED ASPHALT**
Author(s)	Daquan Sun, PrinceItoua
Corresponding author	Daquan Sun dsquan@tongji.edu.cn
Key Words	**Waste toner , Crude palm oil , Modified asphalt binder , Rheology , Congo Brazzaville**
Bibliography of Speaker	Prince Igor Itoua is a PhD candidate at the College of Transportation Engineering, Tongji University.
Abstract	This research focuses on the prospect of saving the environment from pollution caused by waste materials through the use of waste toner and waste palm oil as asphalt pavement modifiers. For this purpose, one type of waste toner powder was used to prepare the waste toner-modified asphalt (WTMA). Then, three weight ratios of Congo crude palm oil (CCPO) to toner asphalt binder, 0.5%, 1.5%, and 2.5%, were selected to prepare the CCPO/WT composite modified asphalt binder. The main objective of this research was to evaluate the effect of CCPO on toner-modified asphalt properties. Several testing procedures such as viscosity, multiple stress creep recovery (MSCR), rutting factor (G*/sinδ) and fail temperature, frequency sweep, and linear amplitude sweep (Las), as well as Fourier Transform Infrared Spectroscopy (FTIR), were conducted. The test findings showed that CCPO-based additives can

	lower the viscosity value of toner-modified asphalt, lowering the mixing and compaction temperatures of the mixture. In addition, the LAS test shows that toner-modified binder with CCPO has better fatigue resistance than WTMA, however exhibits lower fail temperature and G*/sinδ value than WTMA regardless of CCPO content. Furthermore, the toner-modified asphalt containing 0.5% of CCPO has better rheological properties than those containing 1.5% and 2.5% of CCPO.

A0113

Title of Speech	**ENHANCING COASTAL HIGHWAY RESILIENCE: PLANNING AND ENGINEERING INSIGHTS FROM TAIZHOU NO.1 SCENIC HIGHWAY**
Author(s)	Wenbo Zhang, Chen Wang, Huafeng Gong, Boya Huang
Corresponding author	Boya Huang huangboya@tylin.com.cn
Photos	
Key Words	**Coast Highway Engineering Design , Road Network Resilience , Risk Assessment , Traffic Optimization**
Bibliography of Speaker	Boya Huang joined T.Y.Lin International China in June 2015 and currently is a project manager in the position of sustainable transportation engineer. He received his MSc degree in Transport from Imperial College London in 2014, and a Bachelor's degree in Supply Chain Management and Information System from the Pennsylvania State University in 2012. Boya Huang has been at the forefront of innovative transportation planning and engineering for over 9 years, specializing in the areas of sustainable transportation and urban resilience. As an engineer,

	planner and analyst, Boya Huang is motivated to establish strategic thinking and sustainable solutions to successfully deliver projects collaborating with T.Y. Lin's worldwide partnerships.
Abstract	Taizhou No.1 Scenic Highway traversed 7 cities, counties and districts, and plays a significant role in regional economic development and cultural interconnections. Taizhou is a city prone to frequent natural disasters, particularly typhoons and heavy rainfall in May. Those disasters and their consequent secondary disasters can inflict significant damage upon road networks and infrastructure, resulting in substantial economic losses and casualties each year. The road network resilience plays a critical role in a city's overall performance. In this research, key resilient indicators were determined to reflect the level of reliability of the road network, with a paramount emphasis on evaluating the entire Taizhou No.1 highway road network and critical road segments in terms of the capacity for offering alternatives, recoverability, and disaster reliance during unforeseen coastal events. In a road network, certain nodes, road segments, and facilities assume critical roles, either by their functionality (e.g., transportation and tourism) or certain locations within the road network (e.g., adjacency to geographical features like mountains or cliffs). Failures of such components often lead to severe adverse impacts. In this research, critical components within the highway's network were identified by conducting risk assessment and hazard inspection for typic infrastructure categories along the route, and various scenarios of unforeseen events such as asset damage caused by adverse weather conditions, emergent evacuation, random traffic incidents and deliberate attacks were analyzed. By leveraging the available capacity of the entire road network, spatiotemporal traffic resilience was able to be integrated into destination choice models. One of the strategies for resilience optimization in transportation networks is to ensure a rational allocation and scheduling of limited resources and costs when an unforeseen event takes place. The findings of this research provided a valid resiliency assessment of coastal highway road networks, and various countermeasures were analyzed against their performances under different

	disaster scenarios. The outputs of this work can be adopted to facilitate the provision of optimal guidance for destination and route selection for evacuees and autonomous vehicles during evacuation periods, as well as to optimize urban planning and transportation strategies of such areas.

Session 6: Environmental Impacts

Moderators: Dr. Alexis POULHES & Dr.Prince Igor ITOUA

Time (Shanghai): 2023-11-21 18:30 - 20:10

Time UTC+1 (Paris): 2023-11-21 11:30 - 13:10

A0009

Title of Speech	**RESEARCH ON CLIMATE CHANGE RISK OF AIRPORTS FROM THE PERSPECTIVE OF CLIMATE RESILIENCE**
Author(s)	Yuxiu Chen, ShiqiYang
Corresponding author	Shiqi Yang yangshiqi0823@163.com
Photos	
Key Words	**climate resilience , risk assessment , airport**
Bibliography of Speaker	Yang Shiqi, currently working towards the master's degree major in aviation transportation with Civil Aviation University of China in Tianjin. She received the bachelor's degree in transportation in 2022. Her research field is climate adaptation and the resilient development of civil aviation. The email is yangshiqi0823@163.com.
Abstract	At present, the increasing frequency and intensity of extreme weather events as well as climate change have

	great negative effect on air transport activities, including operation, safety, and finance. As a consequence, it is urgent to research on the adaptation to deal with the risk posed by climate. In terms of existing literature, compared with mitigation, there are still some research gaps in adaptation, especially lack of research focusing on specific subjects such as civil aviation which is an important link of global network and sensitive to climate change. It is the scientific evaluation of climate change risks that is primarily required to form a basis on following measurement of climate resilience and systematic adaptation planning. Besides, of all air transportation stakeholders, airports are most prone to be affected by the climate. Therefore, targeting building resilience, this research develops an overall risk evaluation model for coastal airports which can identify the climate risk level of specific airports, then provide suggestions for the climate resilient development of this industry and bridge the research gap. Based on literature analysis and expert investigation, we firstly sorted out the climate risk sources and selected a series of indicators to create a three-dimension index system comprising hazard sources, exposure, and vulnerability for thorough risk analysis. Next, due to the uncertainty in the research process, the fuzzy theory was combined with the element theory to quantify the climate risk level. To verify the viability of the indicator system, we took one airport as an example and applied the data of its operation and regional meteorology to the model. It turns out that the airport's climate change risk is comprehensively evaluated and the risk levels of each dimension are concluded. All in all, this study has developed an effective information tool for the identification of climate change risk and provided valid decision references for subsequent adaptation planning for airports. In the future, according to the results, airports are capable of measuring resilience and confirming the priority of adaptation action to increase the ability to deal with climate change and build a more adaptive society.

A0106

Title of Speech	**Modelling the Performance of Interchange to Improve Congestion and Environmental Pollution: A Case Study in Accra, Ghana**
Author(s)	PATRICK OPATA
Corresponding author	PATRICK OPATA opatapatrickkwabena@gmail.com
Key Words	**Interchange performance , Traffic congestion , Transportation infrastructure , Ghana , Roundabout , Rabi interchange , PTV Vissim , Calibration , GEH formula , Environmental impact.**
Bibliography of Speaker	Patrick Opata MSc. Candidate from Regional Transport Research and Education Centre, Kumasi (TRECK), Department of Civil Engineering, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana, BSc. Civil engineering from Kaaf University College and HND from Kumasi Polytechnic. The CEO of P.K.O Engineering Services which is into Geotechnical Engineering and Structural Designs currently a Structural Principal consultant at the Rock City Hotel-Ghana. An Assistant Engineer at Ghana Highway Authority with 11 years of experience in the Road Geotechnical and pavement design. A Cooperate member and Examiner at the Ghana Institution of Engineering. Double as the Head of the Materials Division at Mawums Limited. Served as the Roads

	and Bridges Inspector for Sweco-Denmark & Hag Consults on the Dannida northern bridge. Before officially appointment as an assistant engineer at Ghana Highway Authority, I was hired by Ghana Highway Authority on a contract basis as a materials engineer on Bituminous Surfacing and Asphaltic Roads which I supervised over 15 roads nationwide.
Abstract	Modeling the Performance of Interchange to Improve Congestion and Environmental Pollution: A Case Study in Accra, Ghana Abstract This research focuses on a comprehensive evaluation of the performance of selected roundabouts and the Rabi interchange design in Ghana. Although interchanges are designed for several decades' capacity, some configurations are easily heavily congested. The Legon to Madina-Atomic Road to Haatso road junction interchange in Accra, frequently experiences congestion and epitomizes these issues. To obtain comprehensive data, this study utilized a combination of methodologies, including the pneumatic tube and counting device and manual enumeration techniques. Data collection including traffic counts, travel times on sections, queue lengths, and delay patterns, traffic volume and vehicle classification were undertaken. Primary data collection occurred during AM and PM peak hours. Additionally, a Micro-Counter device for throughput assessment during the morning peak period from 6:00 am to 6:00 pm, with additional turning movement counts at the intersection conducted on June 30, 2023, from 3:00 pm to 6:00 pm.. The travel time along intersection approaches crucial for calibrating the PTV Vissim model was measured, which simulated various traffic scenarios. To ensure model accuracy, rigorous error checks were conducted following FHWA guidelines. The Quality control tests for calibration including the GEH and T-Test, were employed to establish a robust statistical relationship between field data and the calibrated model. The study investigates the extent of congestion reduction and travel time improvements brought about by different improvement options. The following project alternatives were explored for the effect on congestion and environmental pollution during congestion: Baseline: Single Lane roundabout and all approaches with single lane entry and exits. Option 1: Introduction of a Slip Lane on the West

	Approach. Option 2: Implementation of a Signalized Four-Phase Intersection, incorporating an exclusive Right-urn Slip from West to North Option 3: Optimization of the Three-Phase Signalization with the Addition of Extra Throughput Lanes in the East and West Directions. Option 4: Expansion Choice Involving a Two-Lane Addition, Spanning from West Lane to East Lane. For the proposed improvement strategies, Options 1 and 2 had an equal level of performance with LOS-E whereas Option 3 with a medium performance with LOS-D at the intersections. The results showed that performance measures for Option 4 were superior to Options 1,2 and 3. Based on the provided metrics of LOS, individual queue length, and travel time delay, "Option 4" is the most favourable option. It demonstrates the best Level of Service (B), with the shortest vehicle delay (13.09 seconds), and the shortest queue length (12.29 meters). This option not only promised the highest Level of Service (B) but

A0107

Title of Speech	**EXPLORING SUBJECTIVE HEALTH COMPLAINTS OF TRAFFIC NOISE EXPOSURE FROM ROADSIDE RESIDENTS IN KUMASI, GHANA USING EXPLORATORY FACTOR ANALYSIS AND STRUCTURAL EQUATION MODELLING**
Author(s)	Samuel Ato Andam-Akorful , Atinuke O. Adebanji , Charles Anum Adams , FidelmaIBILI
Corresponding author	Fidelma IBILI fibili@st.knust.edu.gh
Key Words	**subjective health impacts , AMOS software , structural equation model , exploratory factor analysis; , traffic noise pollution**
Bibliography of Speaker	Fidelma IBILI, holds a Bachelor's degree in Civil Engineering (B.Eng.) from Ambrose Alli University, a Master's degree in Civil Engineering (Transportation Engineering option) (M.Eng.) from Federal University of Technology and she is on the verge of completing her PhD program in Highway and Transportation Engineering under the World Bank Africa Centre of Excellence (ACE) scholarship scheme, through the Regional Transport Research and Education

	Centre Kumasi (TRECK) at the Kwame Nkrumah University of Science and Technology, Kumasi. Her professional interests focus on Sustainable Urban Transport Infrastructures and road safety. Her current projects include the investigation and modelling of Traffic Noise pollution and its health impacts. She has published three articles on this thematic area. In addition, she is a member of the International Association of Engineers, Graduate Member of the Nigerian Society of Engineers (NSE) and Health Safety and Environment.
Abstract	Transportation system causes noise-induced annoyance, which is a threat to the environment, notably in urban areas. Frequent noise exposure can trigger annoyance, which is characterised by discomfort, depression, anger, and headaches that interfere with daily activities. Modelled or measured noise levels have been applied in previous studies to examine the impact of road traffic noise on psychological health. However, each person's perception of noise is unique from the other's and an individual's subjective experience can alter with time. Therefore, this study aimed to evaluate participants' perceptions of traffic noise and how it influences their health. In this work, exploratory factor analysis (EFA) followed by structural equation modelling (SEM) was integrated to assess the subjective health complaints under daily exposure to traffic noise environment. A roadside dweller perception survey through simple random sampling was conducted. Paper-based questionnaire survey was administered to a sample of 1000 participants living along road corridors. The questionnaire was prepared based on demographics, environmental conditions, and primary effects of traffic noise pollution. Three common latent factors; "Traffic noise exposure" (TN_E), "Traffic noise sources" (TN_S), and "Subjective health impacts" (SH_I), which summarize 10 questionnaire response items were obtained by EFA. The model was validated by testing the proposed hypothesis using Absolute fit, Incremental fit, and Parsimonious goodness-of-fit indices. It was found that SH_I factors like headache, hearing loss, lack of sleep and stress were greatly influenced by the primary factors of the latent factor "TN_E" with a path coefficient of 1.145. The second latent factor "Traffic noise sources" (TN_S), which was

	associated with parameters like heavy trucks and honking sounds showed less path coefficient of 0.322. The health of residents at the study locations is affected by the prominent effects of daily exposure to traffic noise pollution and least by traffic noise sources. The developed model clarified some casual relationships among complex systems in the study of traffic noise exposure and sources on individuals in Kumasi city. The results of the study may aid town planners, and transport and environmental experts in urban planning, and transport impact assessment especially in low and middle-income countries.

A0128

Title of Speech	**TRAFFIC MANAGEMENT APPROACH TO IMPROVE ROAD SIDE TRAFFIC POLLUTION EXPOSURE NEAR CONGESTED INTERSECTION THROUGH MICROSIMULATION MODELLING – CASE STUDY IN LAGOS, NIGERIA**
Author(s)	Charles Adams, Samuel Ajayi
Corresponding author	Samuel Ajayi samopresident16@gmail.com
Photos	
Key Words	**Vehicle emissions , Air pollutants , Traffic volume , Vehicle fleet , PTV VISSIM**
Bibliography of Speaker	Samuel Akintomide Ajayi is a Senior Research Officer with the Nigerian Building and Road Research Institute (NBRRI). He is registered highway engineer with M.Eng. in Transportation Engineering and Ph.D in Highway and Transportation Engineering from the Regional Transport Research and Education Centre, Department of Civil Engineering of the Kwame Nkrumah University of Science

	and Technology, Kumasi Ghana. He is a young Scholars and has received awards, recognition and grants from VREF, TRECK and the Worldbank. He has authored publications on “transport demand, traffic congestion, air pollution and health” and has participated in several local and international conferences. His research interest is “Transport, Environment and Health.
Abstract	Traffic air pollution is increasingly becoming an alarming public health concern in Developing countries with rapid urbanization and motorization. Efforts to estimate emissions through the integration of traffic simulation models and emissions models is an evolving area of research. In this study, we present four different approaches to reduce vehicle emissions and improve air quality at the selected intersection in Lagos Metropolis using PTV VISSIM. Traffic parameters such as volume, speed, and vehicle mix were inputted into a calibrated VISSIM model for the traffic simulation of the existing traffic conditions. Different scenarios (SC) of traffic volume and traffic composition and proposed signalization of the intersection. were investigated for the traffic simulation, emission of Carbon monoxide CO and Nitrogen oxide NOx. The existing roadside emissions measured at the roadside were used for the calibration of the initial roadside emissions. The result showed 41% and 53% emission reductions for Scenario 1, 60% and 54% emission reductions for Scenario 2, and 46% and 68% emission reductions for Scenario 3 in CO and NOx emissions, respectively. The proposed signalization of the intersection reduces delay, improves flow and speed, and subsequently reduces emissions and improves air quality. The model is therefore robust and accurate in predicting the levels of emissions from road traffic. The study provides strategies to the transport operator, planners, engineers, and policymakers for an efficient traffic management system for congestion reduction, that can be used to manage the effects of air pollutants on public health in developing African cities.

Keynote 4: Digital Intelligent Technologies Enable The Sustainable Development of Urban Transportation System by Prof. Yanyan CHEN

Time (Shanghai): 2023-11-22 15:20 - 16:00

Time UTC+1 (Paris): 2023-11-22 08:20 - 09:00

Chen Yanyan, is Professor, Ph.D. Supervisor and currently the Dean of College of Metropolitan Transportation at Beijing University of Technology, Vice President of Urban Transportation Branch ofChina Highway and Transportation Society,and Executive Director of Traffic Engineering and Information Branch of China Highway and Transportation Society. She is also the Director of "Key Laboratory of Advanced Public Transportation Science, Ministry of Transport, PRC", Executive Deputy Director of "Beijing Engineering Research Center of Integrated Transportation Systems Management and Operation" and "Beijing Key Laboratory of Traffic Engineering". She has been selected into the National Hundred, Thousand and Ten Thousand Talents Project and Beijing Nova Program of Science and Technology. She has also been awarded the title of National Outstanding Teacher by Ministry of Education, PRC and Beijing Outstanding Young and Middle-aged Teacher. Her research interests include transportation big data, intelligent connected vehicles,urban transportation planning and management, and has achieved a series of innovative outcomes. She has published more than 100 articles in peer-reviewed journals, 10 academic monographs and authorized 16 national invention patents. She has also undertaken nearly 100 scientific research projects, including multiple national key Research and Development programs. She is also the recipient of more than 20 provincial and ministerial-level scientific research awards.

Abstract

In the era of intelligent and Internet of Everything, the living mode and travel demand for urban residents have occurred large change. To move to safer, more efficient, lower carbon consumption and more resilience transportation system, many new challenges are faced by city government and transport service operators, In the report, three application Scenarios are introduced to show how the digital Intelligence technologies support the urban transportation sustainable development. 1) to improve the public transport attractive force by door to door trip train portrait and decision support for various kind or countermeasures such as network optimization, TOD, walking-bicycle environment improvement, appointed for travel and so on. 2） to make targeted travel demand management and traffic management to reduce vehicle usage and encourage eco-driving as well as green travel. 3) to evaluated resilience of multi-modal public transit and give improvement countermeasures. In the conclusion, future vision are looked forward.

session 7: Active Transport

Moderators: Prof. Jérôme MONNET & Dr. HANG Peng

Time (Shanghai): 2023-11-22 16:00 - 17:30

Time UTC+1 (Paris): 2023-11-22 09:00 - 10:30

A0103

Title of Speech	**NON-MOTORIZED TRANSPORT IN INFORMAL SETTLEMENTS: CASE STUDY KIBERA SLUM, NAIROBI, KENYA**
Author(s)	DANIELKABUU
Corresponding author	DANIEL KABUU danielirungu803@gmail.com
Photos	
Key Words	**Barriers , perceptions , NMT**
Bibliography of Speaker	Daniel Irungu has Conducted intensive fieldwork and engaged with stakeholders in the public transport sector in Nakuru for the past two years, Identifying and mapping experts and stakeholders, conducting surveys, key informant interviews, case studies, Focus Group Discussions, report writing & convening stakeholder dissemination workshops. He is a transport and governance researcher with 2 years of professional experience in project's implementation for multi-year programmes funded by international donors and agencies including; ILO, FES, and ITF. Currently doing research work

	at Nakuru City Board and a holder of a Degree in Urban and Regional Planning with IT, Irungu has experience, in the research, oversight and implementation of various projects, Establishment of Results Based Monitoring and Evaluation Systems, including the establishment of the Results Measurement plans. Previous to this (2021-2023), he worked as the Research Assistant in several international organizations such as Friendrich Ebert Stiftung which has its roots in Gernmany, The International Labor Organization (ILO). he has also conducted short-term research work either as a research assistant or field coordinator in several NGOs that have included; the International Transport Workers federation (ITF).
Abstract	ABSTRACT Non-motorized transport (NMT) is a mode of transport that offers efficient, cheap, safe, and convenient mobility and can provide residents with access to basic needs such as education, healthcare, and employment. Encouraging the use of NMT reduces reliance on the use of vehicles thus reducing challenges facing the world through emissions and traffic snarl-ups. In Africa, NMT such as walking and cycling, has been identified as a potential solution to the transport challenges faced by residents of informal settlements. According to the World Bank, over 60% of urban residents in sub-Saharan Africa live in informal settlements (World Bank, 2018). These settlements are characterized by poor transport infrastructure, limited access to public transport, and inadequate road networks. Major streets in Kibera informal settlement are not planned to accommodate NMT as a mode of transport. This street designs focuses on vehicular mobility and is less concerned on the safety and mobility of NMT thus posing a great challenge to urban mobility. There is a need to plan for NMT by allocating more space and entirely focusing on those who walk and cycle along urban areas. This research aimed at assessing Non-Motorized transport provision, usage, and its implications on the lives of people living in informal settlements. The study further assessed the existing Non-Motorized transport modes and facilities within the Kibera area, their challenges, and opportunities. Key informants' questionnaires were carried out targeting key NMT players such as Kenya National Highway Association (KeNHA), Kenya Urban Roads

	Authority (KURA), Nairobi County Transport and planning department, Kenya Railways, and academicians. The key objectives for this study were: 1. To assess the current state of non-motorized transport infrastructure in Kibera, Nairobi. 2. To investigate the perceptions and attitudes of residents towards non-motorized transport in Kibera, Nairobi. 3. To identify the barriers and challenges faced by residents in using non-motorized transport in Kibera, Nairobi. 4. To examine the impact of non-motorized transport on the daily lives and access to basic services of residents in Kibera, Nairobi. Primary data was obtained through fieldwork questionnaire interviews with various road users, online key informants' interviews, field crosscut walks, taking photographs, and recording GPS coordinates for mapping. Secondary data was collected from various institution reports, internet search engines, and university respiratory. Various software were used to analyze such as; Microsoft Excel, AutoCAD, and (ArcGIS) The research rationale shows there is a lack of NMT provision and conflicts between commercial land uses and pedestrians, pedestrians, and vehicular traffic due to unplanned highway, commercial street vendors and other business. The study recommended various planning interventions such as the provision of NMT facilities and amenities within the major streets, and replanning some land uses by proposing a market, a parking facility, recreational facilities, and a railway station.

A0104

Title of Speech	**WALKING AS TRANSPORT: DETERMINANTS, BARRIERS AND OPPORTUNITIES IN NAIROBI'S LOW AND MIDDLE INCOME AREAS**
Author(s)	Paschalin Basil
Corresponding author	Paschalin Basil passybasil2015@gmail.com
Key Words	**Opportunities , Barriers , Determinants ,**

Photo of Speaker	
Bibliography of Speaker	Paschalin Basil has Conducted intensive fieldwork and engaged with stakeholders in the public transport sector in Nairobi for the past eight years, Identifying and mapping
	experts and stakeholders, conducting surveys, key informant interviews, case studies, Focus Group Discussions, report writing & convening stakeholder dissemination workshops. She is a transport and governance researcher with 8 years of professional experience in project's implementation for multi-year programmes funded by international donors and agencies including; ILO, USAID, FES, NORAD, and ITF. Currently doing research work at UoN-IDS and a holder of a Master's Degree in Development studies, Basil has wide experience, in the research, oversight and implementation of various projects, Establishment of Results Based Monitoring and Evaluation Systems, including the establishment of the Results Measurement plans. Previous to this (2019-2022), she worked as the Research Consultant in several international organizations such as Friendrich Ebert Stiftung which has its roots in Germany, The International Labor Organization (ILO) and Forcier Consulting. she has also conducted short-term research work either as a research assistant or field coordinator in several NGOs that have included; The Norwegian Agency for Development Cooperation, the International Transport Workers federation (ITF) and the Social Science Research Center Mississipi State University.

Abstract	Africa is one of the fastest urbanizing continent in the world. Concerns on how to improve transportation and mobility in cities has prompted city officials and policy makers to strive to create livable communities. As a result, walking has become the dominant mode of travel in cities with majority of low income urban households in sub-Saharan Africa depending on walking which is an essential component in an urban transport system in terms of mobility and access. In Kenya, majority of people travel on foot (47%), followed by public transport (42%) and car (10%). The decision to walk is due to lack of choice; unaffordable cost of motorised transport and inadequate transport system. Walking is largely perceived as mode for the poor; an 'alternative transport'. The question to ask is- If household incomes improve, will people continue to walk? Thika road is one of the mega road projects in Kenya that has integrated walking facilities. However, there are concerns over safety of pedestrians on highway and
	adequacy of walking infrastructure. Walking as a form of transport offers an opportunity for individuals to become more active and enjoy regular exercise while performing a functional journey. Previously, transportation planners viewed movement by foot as recreational rather than legitimate transport to be seriously considered. However, it is now evident that the significance of the environment in influencing walking in terms of allowing or not allowing walking is mainly concerned with the role of the built environment in the process of making the choice to walk or not. Understanding the determinants of walking as a mode of transport has significant implications for public health, transportation planning, and transport facilities investments. This could help in formulating policies that could enhance walking and active transport as a whole. This study seeks to first, examine the determinants of choice of walking as a mode of transport and how the determinants are linked, from a demand and a supply perspective. Second, investigate the gaps/barriers to walking in Nairobi's low and middle income areas and third, to explore the future of walking in Nairobi.

A0081

Title of Speech	**DEVELOPMENT OF CRASH MODIFICATION FACTORS OF SPEED HUMPS TO ASSESS THE EFFECTIVENESS OF TRAFFIC CALMING MEASURES IN REDUCING PEDESTRIAN CRASHES ON URBAN ROADS IN KUMASI.**
Author(s)	Kwame Osei Kwakwa, Collins Nketiah, Charles Adams, Augustus Ababio-Donkor, FatimaAbdallah
Corresponding author	Fatima Abdallah yusifat300@gmail.com
Photos	
Key Words	**Pedestrian-vehicle crash , speed humps , crash modification factors (cmf) , road safety , urban roads**
Bibliography of Speaker	Fatima Yusif Abdallah is a passionate civil engineer from Ghana, who is dedicated to improving urban environments and ensuring safe transportation systems. She holds a Bachelor's degree in Civil Engineering and is currently pursuing a master's degree at The Regional Transport Research and Education Centre (TRECK) at Kwame Nkrumah University of Science and Technology (KNUST). Fatima Yusif Abdallah is a staff of the Department of Urban Roads (DUR) with seven years of experience as a Traffic and Safety Engineer, who has made significant contributions to enhancing road safety and urban mobility in Ghana. Fatima is poised to continue her impactful work in shaping transportation systems for the benefit of her country and its people.

Abstract	Development of Crash Modification Factors of Speed Humps to Assess the Effectiveness of Traffic Calming Measures in Reducing Pedestrian Crashes on Urban Roads in Kumasi. Fatima Y. Abdallah*1, Augustus Ababio-Donkor1, Charles A. Adams1, Collins A. Nketiah1 & Kwame K. Osei2 1Regional Transport Research and Education Centre Kumasi (TRECK), Kwame Nkrumah University of Science and Technology (KNUST), PMB, University Post Office, KNUST, Kumasi, Ghana. Department of Civil Engineering, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi 2 Department of Civil Engineering, Kumasi Technical University (KsTU) *Corresponding author (yusifat300@gmail.com) Abstract: The World Health Organization (WHO) reports that approximately 12 million pedestrians suffer road traffic injuries annually. In Ghana, they account for more than

	40% of all road traffic crashes, with the Ashanti region experiencing the highest rise in fatal crashes at 23.4%. To address this issue, speed humps have been implemented along some road corridors, but their effectiveness in reducing pedestrian crashes remains understudied, limiting valuable insights. This study evaluated the effectiveness of speed humps in reducing pedestrian-vehicle crashes, using the crash modification factor (CMF). CMF is a multiplicative factor that indicates the proportion of crashes that would be expected after implementing a countermeasure. A CMF value below 1 indicates a crash reduction, while a value above 1 indicates an increase in crashes. The study employed the Empirical Bayes Before/After Observations method, utilizing primary data from field visits and observations, as well as secondary data from the DUR and the BRRI accident database. The study indicated that the implemented speed humps effectively reduced pedestrian-vehicle crashes with an estimated CMF value of 0.73 but led to an increase in vehicular-vehicle crashes with an estimated CMF value of 1.24. Regarding crash severity, the study found that speed humps led to lower severity for pedestrian crashes (i.e., a CMLS value of 0.60) but could not improve vehicular crash severity (CMLS value of 1.02). The implemented measures had a neutral impact on property damage, with a CMLS value of 1.00. To verify the CMF findings, crash rates before and after treatment of the road corridors were compared over time, and the findings were consistent with those of the CMF. The study suggested that, while speed humps can contribute to reducing pedestrian crashes, additional road safety measures are necessary for a comprehensive approach to tackling the problem of road accidents in the region. Keywords: Pedestrian-vehicle crash, speed humps, crash modification factor, road safety, urban roads.

A0063

Title of Speech	**NON-LINEAR RELATIONSHIP BETWEEN BUILT ENVIRONMENT AND ACTIVE TRAVEL: A HYBRID MODEL CONSIDERING SPATIAL HETEROGENEITY**
Author(s)	Tu Meiting, LiuLexuan(Speaker)

Corresponding author	Tu Meiting meitingtu@tongji.edu.cn
Key Words	**Active Travel , Built Environment , Nonlinear Effect , Spatial Heterogeneity , Hybrid Model , SHapley Additive exPlanations**
Bibliography of Speaker	Second year of master degree in School of Transportation, Tongji University
Abstract	Exploring the impact of the built environment on active travel is of great significance for promoting green transportation and urban sustainability. Existing studies mainly focused on urban centers, with limited studies on suburban environments, ignoring the implications of spatial heterogeneity. This study aims to conduct a comprehensive spatiotemporal analysis and explore the nonlinear relationship between built environment and active travel in suburban areas. We introduce a novel hybrid modeling framework that combines eXtreme Gradient Boosting(XGBoost) and Multi-scale Geographic Weighted Regression (MGWR) to forecast suburban active travel demand with the consideration of the nonlinearity and spatial heterogeneity in parameter estimates. SHapley Additive exPlanations(SHAP) is introduced to elucidate the non-linear relationship between built environment variables and active travel. Results show that the hybrid model outperforms previous single models. The density of tourist attractions, transportation facilities, and household properties emerges as the three most influential factors affecting residents' active travel behavior. Social-economic attributes account for 15.70% of the prediction, while accessibility, transportation facilities, and land use, as three categories of built environment variables, contribute 7.31%, 5.13%, and 71.87%, respectively. The hybrid model appears to be effective to identify the nonlinear relationship and threshold effects between built environment variables and active travel, providing valuable references for designing sustainable and efficient suburban environments.

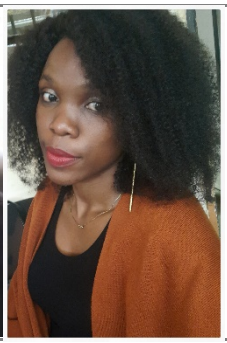
Session 8: Inclusive Transport

Moderators: Dr.Liu LIU & Dr. NIAN Guangyue

Time (Shanghai): 2023-11-22 18:10 - 19:50

Time UTC+1 (Paris): 2023-11-22 11:10 - 12:50

A0105

Title of Speech	**Enhancing Pedestrian Safety & Accessibility, Case Studies from Nairobi Low and Middle Income Areas**
Author(s)	Gladys Nyachieo, Paschalin Basil(Speaker), Mercy Edna Manyasa(Speaker)
Corresponding author	Gladys Nyachieo gmasomo@gmail.com
Key Words	**PLDWs , safety , pedestrian , infrastructure , access ,**
Photos	 

Bibliography of Speakers	Paschalin Basil has Conducted intensive fieldwork and engaged with stakeholders in the public transport sector in Nairobi for the past eight years, Identifying and mapping experts and stakeholders, conducting surveys, key informant interviews, case studies, Focus Group Discussions, report writing & convening stakeholder dissemination workshops. She is a transport and governance researcher with 8 years of professional experience in project's implementation for multi-year programmes funded by international donors and agencies including; ILO, USAID, FES, NORAD, and ITF. Currently doing research work at UoN-IDS and a holder of a Master's Degree in Development studies, Basil has wide experience, in the research, oversight and implementation of various projects, Establishment of Results Based Monitoring and Evaluation Systems, including the establishment of the Results Measurement plans. Previous to this (2019-2022), she worked as the Research Consultant in several international organizations such as Friendrich Ebert Stiftung which has its roots in Gernmany, The International Labor Organization (ILO) and Forcier Consulting. she has also conducted short-term research work either as a research assistant or field coordinator in several NGOs that have included; The Norwegian Agency for Development Cooperation, the International Transport Workers federation (ITF) and the Social Science Research Center Mississipi State University. Mercy Edna Manyasa is a transportation engineer with a specialized focus on sustainable transportation, active mobility, electric mobility, and intelligent transport systems. She holds a Master's degree in Transportation Engineering. Throughout her career, she has acquired valuable experience in road planning, design, and construction across various government and private institutions. Currently, as an Assistant Lecturer at the Technical University of Kenya, Edna imparts her expertise in these areas to her students. Beyond her teaching role, she is deeply involved in research and enjoys mentoring young engineers.

Abstract	The lack of essential infrastructure makes the experience of walking in African countries difficult, unpleasant, and dangerous (UNEP, 2022; Kumar and Barrett, 2008).). Therefore, transport policy in Africa needs to recognize the integral role that walking plays in any sustainable transport system and ensure safety for those walking. Some cities in Africa are adopting non-motorized transport (NMT) policies that call for a safe, comfortable, and convenient environment for pedestrians. For example, Nairobi has an NMT policy. Walking is a crucial form of affordable transport that enables the accomplishment of primary trips and accrue significant health benefits in addition to lowering of carbon emissions. Unfortunately, those walking in many parts of Africa are "captive walkers." This is partly due to non-inclusive transport planning or not planning for pedestrians which results to undesirable and unsafe pedestrian infrastructure. For those pedestrians living with disabilities (PLWDs), it is a constant challenge accessing and utilizing the urban space. This is a comparative study that explores access and safety challenges for People Living with Disabilities (PLWDs) in the study area. Transport infrastructure such as roads have always been given priority because they are seen to provide a structured way of moving people and freight. Both quantitative and qualitative methods are utilized. The study used Gainesville Pedestrian Level of Service (Dixon, 1996) approach to assess quality of pedestrian facilities. Pedestrian Level of Service (PLO) measure allows quantification of comfort and safety levels of existing and planned pedestrian facilities. Other methods used in this study are; mapping of accident hot spots (ArcGIS); a survey using adjusted Neighborhood/surrounding Environment Walkability Scale (NEWS-Africa) tool: Focus Group Discussions (FGDs), co-assessment and photography. The study found that quality of walking infrastructures was low for most roads in both Nakuru and Jinja based on the pedestrian LOS scores which greatly affect people living with disabilities. PLWDs experience and perceptions in Nakuru and Jinja indicated safety concerns. Reference 1. Dixon, L. B. (1996). Bicycle and pedestrian level-of-service performance measures and standards for congestion management systems. Transportation research record, 1538(1). 2. United Nations Environment Program. (2022) Walking and Cycling in Africa

	- Evidence and Good Practice to Inspire Action https://www.unep.org/resources/report/walking-and-cycling-africa-evidence-and-good-practice-inspire-action 3. Kumar, A., & Barrett, F. (2008). Stuck in Traffic: Urban Transport in Africa. Retrieved from: http://www.infrastructureafrica.org.

A0073

Title of Speech	**Study on Living Circle Patterns and Barrier-Free Travel Characteristics of Weak individuals- A Case Study of Four Communities in Shanghai**
Author(s)	Xinyi Wang, Haixiao Pan, JingjieCui
Corresponding author	Haixiao Pan hxpank@126.com
Photo of Speaker	
Key Words	**Inclusive City , Weak individuals , 15-Minute Community Living Circle , Spatial Pattern Characteristics , Pathway Accessibility**
Bibliography of Speaker	Cui Jingjie, master's degree candidate in the School of Architecture and Urban Planning, set to graduate in 2022. My hometown is in Yunnan, China, and I have the privilege of being advised by Professor Pan Haixiao. My research focuses on inclusive cities and accessible streets. In terms of my skill set, I am proficient in the use of ArcGIS for spatial analysis, SPSS for data analysis, and various Adobe software for graphic design. My academic journey has been grounded in the field of urban planning, with both my undergraduate and master's degrees in this discipline. During my master's program, I specialized in Urban Transportation and Infrastructure Planning within

	Tongji University's Department of Urban Planning. Along the way, I have been honored with several titles, including recognition as an outstanding student leader at the university level. My expertise encompasses various facets of urban planning and urban transportation.
Abstract	As the creation of healthy and inclusive cities advances, it is vital to consider the travel accessibility of vulnerable populations, such as the elderly, young people, and individuals with physical disabilities who have limited mobility. Building inclusive cities requires increasing the accessibility of fundamental amenities to ensure the basic right to mobility for these disadvantaged individuals. Key amenities for communities include residential areas, pavements, markets, schools, leisure facilities, and parks. The present paper takes typical communities in Shanghai as a case study to investigate the travel pattern and preferences of vulnerable individuals for essential amenities. This study employs a perspective based on community living circles and utilizes questionnaire surveys, in-depth interviews, and tracking studies for a comprehensive understanding of the subject. Technical term abbreviations are explained upon first use, and the writing style follows academic writing conventions. The study investigates the spatial characteristics and patterns of residents' living areas and measures the accessibility of pathways and segments for pedestrians, as well as for wheelchair users and individuals with mobility aids. The paper presents accessibility strategies aimed at creating barrier-free pathways that align precisely with the travel requirements of weaker individuals and the essential amenities within their community living areas. The research findings reveal that, on average, the radius and standard deviation of the 15-minute living circles ofweaker individuals are smaller than those of individuals with normal physical activity, indicating a trend towards contraction in scale. (2) Individuals with lower socioeconomic status in the central area experience shorter travel distances, more frequent travel, a high concentration of amenities, a well-defined and diverse amenity hierarchy, and smaller living radiuses focused on residential areas. (3) Larger residential areas are more influenced by nearby high-grade roads than smaller ones.

	(4) Barrier-free living circles designed for individuals with disabilities should be systematically, hierarchically, and diversely configured, with a tilted pattern. (5) Despite many activities of individuals with disabilities being concentrated within residential areas, the level of barrier-free construction frequently does not match high-frequency activity spaces. (6) Facilities that are visited more frequently within the living circle tend to have lower accessibility, while facilities with good accessibility have lower usage frequencies. Consequently, this paper proposes strategies to address obstacles to living circle pathway accessibility, taking into account the entire system, the process, the time frame, and the population.

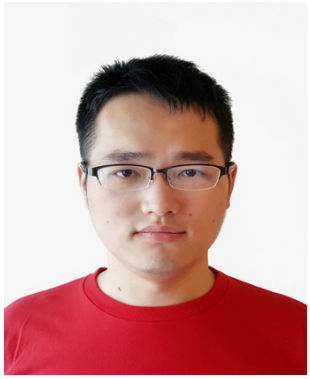
A0068

Title of Speech	**PHYSICAL MOBILITY EXPERIENCES AND ACCESS TO WORKSITES AMONG SMALL SCALE TRADERS WITH SPECIAL NEEDS IN NAIROBI'S CENTRAL BUSINESS DISTRICT**
Author(s)	Cleusius Ondieki, Cleusius Ondieki, CleusiusOndieki
Corresponding author	Cleusius Ondieki marangaon5@gmail.com
Photos	
Key Words	**Special needs**
Bibliography of Speaker	Mr Maranga Ondieki is a seasoned research assistant that has worked for different organizations. He is the founder for Ubuntu in Transport Initiative- An organization that advocates tor improved transport in the community. He holds a bachelors degree in Social Work and master of Development Studies from the University of Nairobi. Currently, he is registered as a PhD student in

	Environmental Studies(Sustainable Urban Development Studies) at Kenyatta University.
Abstract	Most of the PWDs experience high levels of poverty and unemployment. Some work in city spaces that are not planned to meet their needs. While the Sustainable Development Goal (SDG) 11 aims at creating safe, resilient, and inclusive cities, persons with special needs face challenges participating in daily activities that include access to worksites in the city. This study explored the physical mobility experience of small-scale traders with special needs accessing worksites in Nairobi City County. Literature review showed a gap in the implementation of policies and planning of cities in low income countries. The objectives aimed at exploring the physical mobility options and experiences of traders with special needs (PWDs) in accessing worksites and their coping strategies. The study assessed their experiences relating to safety, convenience, and mobility costs by using a descriptive research design and a universal design theoretical framework. The findings showed an existing relationship between physical mobility experience and access to worksites. They took longer to access their worksites, experienced safety issues and found it inconveniencing when navigating to worksites. Small-scale traders with special needs adapted by changing the time they accessed their worksites, relying on guardians, or working fewer hours to respond to access challenges. The study recommends embracing a universal design for cities and mobility modes to make them safe, affordable and convenient for all users. Other recommendations include training drivers and conductors on ways to facilitate the physical mobility of persons with special needs in a better way, and designing safe markets within communities. There is also a need for further research on ways of making different forms of motorized transport disability-friendly.

A0127

Title of Speech	**OM DESIGN TO PRACTICE: REMOVING THE BARRIERS TO CONSTRUCTING BARRIER-FREE STREETS IN NEIGHBOURHOODS**
Author(s)	Jingjie CUI, Xinyi Wang, Haixiao Pan, XiaHua

Corresponding author	Haixiao Pan panhaixiao@tongji.edu.cn
Photos	
Key Words	**Barrier-free , Accessibility , Street Design , Neighbourhood , Urban Governance**
Bibliography of Speaker	HUA Xia, Postdoctoral researcher at Tongji University, research interests interests include transport policy and inclusive design. PAN Haixiao, Professor at Tongji University, research area includes but is not limited to urban transport, land use, and inclusive city. WANG Xinyi, PhD student, research interests include land use and urban development under the impact of high-speed railway CUI Jingjie, Master student, research interests include 15-minute inclusive neighbourhood
Abstract	In China, the barrier-free environment has long been the emphasis of urban design in the past decades. However, neighbourhood streets still cannot provide a safe environment for people with disabilities. To understand why implementing barrier-free design on neighbourhood streets encounters challenges in China, this research carried out an investigation through questionnaires, interviews, and spatial analysis across several residential neighbourhoods in Shanghai, and this article uses Caoyang as a showcase to demonstrate the research result. Specifically, the research reveals three barriers that obstruct the implementation of barrier-free design on neighbourhood streets: the inconsistent andinappropriate barrier-free facilities are defined as physical barriers; the absence of knowledge on barrier-free design among decision-makers and the dependence on car-oriented street design in practice is defined as the conceptual barriers; and the absence of capable authority and

	effective working mechanism to support the implementation is defined as institutional barriers. Accordingly, the article offers four strategies to resolve these barriers: enforcing barrier-free street design by law, establishing an exclusive authority and working mechanism, educating the general public, and enhancing public participation. These results underscore the importance of multi-disciplinary input from not only infrastructure engineers and urban designers but also social engineers and politicians in promoting sustainable urban design. The experience and suggestions discussed in this article will not only benefit the development ofbarrier-free neighbourhoods in the context of China but also have broader implications for urban management and governance in other contexts.

Session 9: Smart Vehicles and Connectivity

Moderators: Dr. Nadir FARHI & Prof. WANG Chao

Time (Shanghai): 2023-11-22 16:00 - 17:30

Time UTC+1 (Paris): 2023-11-22 09:00 - 10:30

A0072

Title of Speech	**SAFE REINFORCEMENT LEARNING OF LANE CHANGE DECISION MAKING WITH RISK-FUSED CONSTRAINT**
Author(s)	ZhuorenLi
Corresponding author	Zhuoren Li zrli_96@163.com
Photos	
Key Words	**Decision Making , Reinforcement Learning , Safe Driving , Autonomous Driving**
Bibliography of Speaker	Zhuoren Li received his B.S. degree in School of Aerospace Engineering and Applied Mechanics, Tongji University, Shanghai, China, in 2019. He is currently pursuing his Ph.D. degree with the School of Automotive Studies, Tongji University, Shanghai, China. His research interests include decision making, motion planning, reinforcement learning of autonomous vehicles.
Abstract	Deep reinforcement learning (DRL) has become a powerful

	method for autonomous driving while often lacking safety guarantees. In this paper, we propose a Risk-fused Constraint Deep Reinforcement Learning (RCDRL) with D3QN network for safe decision making in lane change maneuver. The problem is formulated as a state-wise MDP (SCMDP), which embeds a rule-based risk-fused Constraint module. We map the decision action to the trajectory layer via a polynomial curve-based trajectory planner, which is combined with the predicted trajectories of surrounding vehicles to assess future risk and correct the unsafe action. Therefore, the proposed method can deal with unsafe decision actions when training the policy network. To investigate the decision performance, the trained RCDRL policy is tested and validated under different traffic densities. In particular, we implement real vehicle tests to validate the effectiveness of the proposed method. Simulation and real vehicle tests demonstrated that the proposed RCDRL method achieves better performance, especially in safe decision. In addition, the framework can be extended with other advanced DRL networks.

A0074

Title of Speech	**A SEAMLESS MOTION PLANNING INTEGRATING MANEUVER DECISION BASED ON HYBRID MODEL PREDICTIVE CONTROL**
Author(s)	Bo Leng, ChengenTu
Corresponding author	Bo Leng lengbo@tongji.edu.cn
Photos	
Key Words	**motion planning , hybrid MPC , integrated scheme**

Bibliography of Speaker	Chengen Tu received his B.S. degree in mechanical engineering from the School of Mechanical Engineering, Xi'an Jiaotong University, Xi'an, China, in 2021. He is currently pursuing his M.S. degree in vehicle engineering from the School of Automotive Studies, Tongji University, Shanghai, China. His research interests include motion planning and model predictive control.
Abstract	Motion planning in autonomous driving poses a significant challenge due to the necessity of ensuring continuity between the actions produced by internal modules and maintaining consistency in optimizing driving behavior. Otherwise, it may lead to overly conservative or irrational driving behavior in complex scenarios. This paper presents a hybrid model predictive motion planner (HMPC) that utilizes a hybrid dynamical model of the process to predict its future evolution and select the optimal control action. It integrates logical decision-making and motion planning, enabling seamless vehicle motion planning without relying on semantic decisions or pre-defined trajectories. Additionally, it enhances the capability for incorporating external decisions. Experimental results demonstrate that HMPC outperforms the traditional hierarchical MPC motion planner in terms of maintaining the desired speed and adapting to external behavior decision-making modules.

A0041

Title of Speech	**Sustainable next generation train control system**
Author(s)	Xiang Gao, XiangGao
Corresponding author	Xiang Gao xiang.gao@thalessec.com.cn

Photos	
Key Words	**sustainable train control system, Resilient operation**
Bibliography of Speaker	Ph.D degree in Physical Electronic. Has 5 years of experience in computer vision system development and 15 years of experience in urban rail train control system development/project commissioning.
Abstract	Urban rail contributed 70% public transportation in Shanghai. With more lines enter revenue, the sustainability of urban rail development become increasingly important. A sustainable urban rail require a sustainable train control system. A sustainable train control system shall be life cycle economic, flexible for different infrastructure/train conditions, evolvable to fully automatic resilient operation. This presentation will show how does the next generation train control system utilize the latest technologies: all electronic drive, cloud computing, real time Ethernet, 5G and AI, to meet the sustainable targets and enable operation in up limit constrained by infrastructure/train conditions.

A0060

Title of Speech	**COMMUNICATIONS FOR THE SMART SOCIETY IN MOTION: THE JOURNEY FROM 4G TO 6G**
Author(s)	José Rodríguez-Piñeiro
Corresponding author	José Rodríguez-Piñeiro j.rpineiro@tongji.edu.cn

Photos	
Key Words	**Vehicular communications , High-Sped Train , Unmanned Aerial Vehicles (UAVs) , Transportation safety**
Bibliography of Speaker	José Rodríguez-Piñeiro received his B.Sc. (Hons.) and his M.Sc. (Hons.) from the University of Vigo (Pontevedra, Spain), in 2009 and 2011, respectively. Between 2008 and 2011, he was a researcher at the Dep. of Signal and Communications, University of Vigo (Spain). In 2011 he joined the Group of Electronics Technology and Communications (GTEC) of the University of A Coruña (UDC, Spain) as a researcher, obtaining his Ph.D. degree (Hons.) with the distinction "Doctor with European Mention" in 2016. He continued working as a Postdoctoral researcher at the same group until 2017. In 2017 he joined the College of Electronics and Information Engineering, Tongji University (P.R. China), as a Postdoctoral researcher, becoming an Assistant Professor in 2020. He performed several research stays at the Technische Universität Wien (Vienna, Austria) and the National University of Asunción (UNA, Paraguay). From 2012 he collaborates with the Dep. of Power and Control Systems, UNA, in both teaching and research, and he is an external researcher of the GTEC of the UDC since 2018. Since 2023, he is an elected member of the Propagation Committee of the IEEE Vehicular Technology Society (VTS). He is the coauthor of more than 70 papers in peer-reviewed international journals and conferences, as well as three patents and one book; and he has received one “Best Paper” award. He has led or participated in more than 40 international, national and regional research projects. He was awarded with two national- and regional-level predoctoral grants (incl. the Spanish national-level “FPU” program), three national-level postdoctoral fellowships (incl. the Spanish national-level

	“Beatriz Galindo” fellowship and the Chinese national-level “Foreign Experts Bureau for Foreign Young Talents Fellowship” in 2018 and 2022) and three national-level research stay grants, as well as with a postdoctoral award (2020 Tongji Outstanding Post-doctoral Researcher) and two teaching quality awards.
Abstract	Tomorrow’s society is envisioned more and more as lots of people constantly on the move. Daily commuter traffic in urban areas experienced a dramatical increase during the last few years. Although vehicular communications research tends to focus on people using their devices for work and entertainment during transportation, more and more, machine-to-machine communications for autonomous vehicles or transportation safety and efficiency are becoming more prominent. This talk proposes a journey on the evolution of our research on practical evaluation of vehicular critical and safety-related communications for during last 15 years. The journey will start right before the development of 4G, continue with its evolution into 5G and end with the insights on the incipient 6G. Our most relevant results regarding safety-related High-Speed Train Communications, critical UAV communications and Joint Communications and Sensing for autonomous terrestrial and aerial vehicles will be described.

A0100(be presented in the time slot of Session8, due to time conflict)

Title of Speech	**EVALUATION OF AN OCCUPANCY SENSOR ON THE EASTERN RING ROAD OF LYON**
Author(s)	Karimn Ali, AlexisBacelar
Corresponding author	Alexis Bacelar alexis.bacelar@cerema.fr
Photo of speaker	
Key Words	**HOV lane , experimentation , occupancy , sensor**

Bibliography of Speaker	Alexis Bacelar received the Dipl-Ing. Degree in electrical engineering from Polytec engineering school of Clermont-Ferrand University in 1991. He received Ph.D degree in acoustics from INSA de Lyon in 1996. From 1997 to 2002, he worked as a researcher in the civil engineering laboratory in Rouen. His interests include the research and applications linked to road lighting and visiblity model. In 2003, he began to work as an engineer for the French transport ministry in Lyon. His concern include traffic sensor, variable message sign and more generally all material and intelligent transport systems that can improve traffic management and people mobility. He has been working on the subject of automatic occupancy measurement for 15 years. He received Cerema Prize (2015) and ATEC congress best paper award (2016) for implementing the first European PoC of an occupancy sensor in May 2015 at Jougne (French-Swiss border). Karim Ali is the founder and CEO of Invision AI, a provider of next generation Artificial Intelligence vision systems that are highly efficient and scalable designed specifically for applications where speed, cost and privacy are paramount. Karim has over 10 years' experience in the commercial application of machine learning and computer vision. Karim has over a dozen academic publications in international conferences and journals. He holds a Ph.D. in Machine

	Learning from the Swiss Federal Institute of Technology. Prior to founding Invision AI, Karim was a research fellow at the UC Berkeley Artificial Intelligence Research (BAIR) Lab and a visiting scholar at Harvard University.
Abstract	With the development of carpooling and HOV lanes in France, it is important to know the number of carpoolers traveling in a vehicle. Until recently, vehicle occupancy automatic measurement from the side of the road was not done with great accuracy, slowing down the implementation of new applications and infrastructures linked to this practice such as HOV lanes. Today, this increasingly accurate counting allows, initially, to indicate to users if they can travel in the HOV lane. Then, it makes it possible to check that the vehicles present in the HOV lanes are indeed authorized to circulate there, and conditions the credibility of such system to the public : a too high violation rate would discredit the functionality of these lanes. One of the objectives of implementing control is to greatly minimize the risk of recourse. It is essential to focus on false violations, cases of which are commonly called "false positives". These are the cases where the vehicles have a sufficient number of occupants to circulate in HOV lane (VR 2+ for example), but for which the automatic system "undercounts" and considers that there is not enough occupants in the car and thus constitutes an offense. The latest sensors evaluated by Cerema had false positive rates around 5%. The objective of the project was to evaluate the metrological performance of a sensor located at the side of the road. It integrates an innovative system for counting the number of occupants in vehicles based on shape recognition by artificial intelligence . The evaluation took place on the slow lane of the Eastern Ring Road in Lyon in the South-North direction. This axis is managed by the Interdepartmental Direction of Central-Eastern Roads (DIR-CE) and supports traffic of 100,000 vehicles/day, with 20% heavy goods vehicles. The speed is limited to 90 km/h for light vehicles and 80 km/h for heavy goods vehicles. This evaluation ended in July 2023 with very positive results: - first of all, the operational implementation of the system only required half a day (2 to 4 hours). This short duration opens the way to immediate portability of the Invision AI sensor ; -

	moreover, out of 1223 analyzable vehicles, 28 false positives (i.e. approximately 2.3%) and 97.1% true positives (cheaters) detected. These results allow us to consider automatic control of HOV lanes

Session 10: Economics and Regulation

Moderators: Dr. Anne GUILLEMOT & Prof. CAO Zhejing

Time (Shanghai): 2023-11-23 16:00 - 17:50

Time UTC+1 (Paris): 2023-11-23 09:00 - 10:50

A0071

Title of Speech	**THE POLITICAL ECONOMY OF ADOPTION AND IMPLEMENTATION OF BUS RAPID TRANSPORT SYSTEMS IN SUB SAHARAN AFRICA : CASE STUDY OF NAIROBI, KENYA**
Author(s)	Francisco Achwoka
Corresponding	Francisco Achwoka
author	ofrancis@post.bgu.ac.il
Photos	
Key Words	**Bus Rapid Transport (BRT) , Informal Transport , Nairobi , Matatu**
Bibliography of Speaker	Francisco Achwoka is a Kenyan PhD researcher at The Ben-Gurion University of the Negev whose focus is on the nexus of transportation infrastructure development and equity within the Global South.

Abstract	As a rapidly urbanising city, Nairobi requires an urgent and sustainable solution to the mobility needs of its rising population. Its ad hoc paratransit system, composed of ubiquitous minivans called "matatus", has proven difficult for the government and city authorities to govern due to the challenges linked to the political economy surrounding its public transportation. This is the case in many developing countries whose cities have a significant paratransit system. The challenges due to the political economy in Nairobi include the large and distorting role of external actors in the transportation sector, the fragmentation in regulatory institutions, the closed and top-down planning processes, and the absence of social justice components in the planning and implementation of transport infrastructure projects. This research analyzed the factors influencing the delayed implementation of Nairobi's proposed BRT as a case study of challenges facing planning for sustainable public transportation within developing countries. It used a stakeholder analysis framework to evaluate the impact of the city's political economy on the stakeholders and the decision-making process for the proposed BRT. It determined the role of the stakeholders in the process and how its implementation was impacted.

A0051

Title of Speech	**MOBILITY AS A SERVICE: INVESTIGATING OPPORTUNITIES FOR DEEPER INTEGRATION TOWARDS URBAN PUBLIC TRANSPORT ENHANCEMENT.**
Author(s)	Fabien Leurent, SylvainDaou
Corresponding author	Sylvain Daou sdaou@pmpstrategy.com
Photo of speaker	
Key Words	**Mobility as a service (MaaS) , Levels of integration , Public transport efficiency , Inter-service cooperation**
Bibliography of Speaker	Sylvain Daou is a PhD candidate at the International Research Center on Environment and Development (CIRED) at Ecole des Ponts Paristech (ENPC) under the supervision of Fabien Leurent, and a R&D officer at PMP Strategy. His research focuses on the economics of public transport and the cooperation between public transit and new mobility services in the context of urban Mobility as a Service (MaaS).
Abstract	MaaS (Mobility as a Service) is a recent concept embodying the integration of different transport modes and services, both public and private, on a single interface. It has been trialed and implemented in numerous territories across the world. The nature and extent of mobility services integration, as put into practice in today's implementations, revolve around the unification of one or more out of the following commercial functions: planning, booking, payment, and ticketing. This degree of integration, which we describe as superficial, raises questions regarding the ability of MaaS to achieve the

	ambitions attributed to it both by its theoretical conceptualization and by its contracting authorities, in terms of transforming the mobility system on its territory of implementation: transforming the economic model of transportation supply as well as transforming the mobility demand's practices (and thus the levels of associated externalities). Therefore, this paper seeks to explore the potential of MaaS to improve mobility services and their economic models, by investigating deeper forms of mobility services integration. We do so by conducting a brief diagnosis of French urban public transport in order to identify the challenges it faces in terms of effectiveness and economic model. We then explore different aspects of cooperation related to the main notions underlying that of integration. This leads us to propose deeper possibilities of integration: joint demand stimulation, respective specialization, resources pooling, and strategic visions alignment. Consequently, we discuss the potential of MaaS to answer the challenges faced by urban public transport under two scenarios: a superficial integration of mobility services as well as a deeper integration. We conclude that a MaaS featuring deep integration among mobility services could result in increased benefits in terms of supply production efficiency as well as reduced externalities.

A0046

Title of Speech	**TRADABLE MOBILITY RIGHTS: FEASIBLE OR JUST THEORETICALLY ALLURING?**
Author(s)	Mariana Rocha

Corresponding author	Mariana Rocha marianacrmrocha@gmail.com
Key Words	**Travel demand management, Tradable mobility rights, Road transportation externalities, Feasibility, Road pricing**
Bibliography of Speaker	I am a mobility economics researcher at the Centre International de Recherche sur l'Environnement et le Développement (CIRED) in France. I hold Bachelor's degrees in Economics from UFRGS and in International Relations from ESPM, both obtained from Brazilian universities. To further my studies, I came to France to pursue a master's degree in International Economics at USPN, with a specific focus on ecological transition. My current research project, in partnership with Ecole des Ponts ParisTech and Ile-de-France Mobilités, is centered on economic instruments for managing travel demand, particularly tradable mobility rights.
Abstract	Presented as an alternative to road pricing, tradable mobility rights (TMR) have been abundantly advocated by the academic literature as an innovative and more advantageous instrument for correcting congestion and other road transportation externalities. Nonetheless, despite their relatively vast body of scientific literature and their large use in regulating environmental externalities on markets other than mobility, tradable rights have not yet been implemented on road transportation, indicating a gap between the academic and the social perception of TMR as a feasible and effective policy instrument. Are tradable rights truly a feasible instrument for mobility management? The present paper aims to answer this research question by discussing what has been stated about TMR feasibility by researchers – conceptualizers, modelers, economists, behaviorists –, under which basis – logical, numerical study, behavioral study, and within which outreach and limitations. As methodology, a critical literature review on existing TMR literature is conducted in order to identify the gaps that may have contributed to this discordancy between theory and practice. Specifically, three strands of literature on TMR are identified and discussed, first separately and then in a general manner: conceptual, mathematic programming and behavioral

	studies. The existing experiences on emission trading schemes and congestion pricing are also taken into perspective. We argue that, despite its apparent economic and social feasibility, diagnostics on TMR schemes generally rely on unrealistic, inadequate or incomplete representation of travel behavior and network characteristics, either from a mathematic modelling or an experimental approach. Within TMR literature in general, key operational features such as trading, pricing and institutional structure, which are determinant to investigate transaction costs and social acceptability, have been largely overlooked. All these challenges contribute to generate a misleading feasibility assessment of TMRs, and develop skepticism towards a policy implementation. In conclusion, we point out to research directions to better address feasibility in design studies and scheme inception.

A0132

Title of Speech	**THE PROFESSIONALISATION OF ARTISANAL TRANSPORT OPERATORS IN THE AGGLOMERATION OF ABIDJAN: THE CASE OF THE PASSENGER TRANSPORT ON THE EBRIE LAGOON.**
Author(s)	Lanciné Diabate
Corresponding author	Lanciné Diabate lancine.diabate@inphb.ci
Photos	

Key Words	**Mobility , Abidjan , artisanal transport , lagoon transport , pinasse , professionalisation**
Bibliography of Speaker	DIABATE Lanciné, Institut National Polytechnique Félix Houphouët Boigny — BP 1083 — Yamoussoukro Lancine.diabate@inphb.ci
Abstract	The agglomeration of Abidjan is facing real mobility problems due to the demographic pressure it has been experiencing in recent years. This demographic pressure has led to urban sprawl, resulting in longer travel distances and increased mobility needs. This situation is exacerbated by road congestion in the District of Abidjan. The reasons for this are the inadequacy and poor condition of the roads, the incivility of some drivers, the lack of mass public transport and the many road infrastructure construction projects underway. In the light of this situation, lagoon transport is clearly one of the solutions to the above-mentioned problems. At present, lagoon transport services are provided mainly by craftsmen with pinnaces and by three contracted operators: SOTRA, STL and CITRANS. However, it has to be said that transport by the pinnace is carried out in precarious conditions of comfort and safety, endangering the lives of the thousands of people transported every day. Our study on the 'Professionalisation of artisanal transport operators in the agglomeration of Abidjan: the case of lagoon transport' aims to propose a strategy for professionalising artisanal lagoon transport operators in the agglomeration of Abidjan. This process should lead to an improvement in the working conditions of those involved, the quality of the service provided and the safety of users of this mode of transport. The methodological approach is based firstly on data collection through documentary research, interviews, field observation and a field survey, followed by the processing and analysis of the data collected. The study shows that the pinnace sector suffers from inadequate organisation, a lack of qualifications among the players, job insecurity, the absence of equipped stations, insecurity on wooden and dilapidated docks, discomfort and insecurity on board pinnaces, most of which are made of wood, and the absence of safety equipment on board pinnaces. With a view to finding solutions to the weaknesses and shortcomings of this sector, seven (7) major actions are

	proposed, namely: strengthening the regulatory framework, training the players (owners and employees), improving the working conditions of the players, supporting access to financing, renewing the fleet, developing modern infrastructure (platforms and stations) and acquiring security equipment and ticketing terminals. The report also makes a number of recommendations to the government of Côte d'Ivoire. These recommendations concern, on the one hand, the development of quays, stations and feeder roads for gbakas and woro-woros to the pinnace quays and, on the other hand, tax exemption for the acquisition of safety equipment by pinnace owners.

A0133

Title of Speech	**LEAN LOGISTICS SYSTEM FOR GREEN ECONOMY IN INDUSTRIALIZED CITIES**
Author(s)	Fan Li
Corresponding author	Fan Li lifan_0026@mail.tsinghua.edu.cn
Photos	
Key Words	**logistics, Lean, PFEP, Green economy**
Bibliography of Speaker	Dr. Li Fan received a Bachelor of Engineering degree in transportation from Tongji University, and a double Master's degree in transplantation and logistics from Tongji University and ENPC (École des Ponts ParisTech). He received his Ph.D. degree in industrial engineering from ENSAM (Ecole Nationale Supérieure d'Arts et Métiers). Since January 2018, he has been with the faculty of Tsinghua University, where he is currently a lecturer and the deputy director of teaching and research department

	of Fundamental Industry Training Center of Tsinghua University. At present, he is mainly engaged in the teaching and research work in the fields of intelligent manufacturing, logistics, systems engineering, project management, innovation and entrepreneurship education, and has participated in the teaching of a number of national quality courses, school-level excellent courses and school-level general education courses. In recent years, he has won the first prize of the National College Teachers Engineering Maker Teaching Ability Competition, third prize of Tsinghua University Young Teachers Teaching Competition and other awards. As the first author, he has published nearly 20 papers in major academic journals and international conferences at home and abroad, many of which have been included by EI and ISTP. In addition, he obtained 1 software copyright, 3 invention patents, edited or participated in 5 monographs and teaching materials. He has participated in a number of scientific research projects such as national virtual simulation experiment teaching project and national key research and development plan project of the Ministry of Science and Technology, and presided over a number of university-level undergraduate teaching research and reform projects. He has guided students to participate in SRT (College Student Research Training Program) and college student innovation and entrepreneurship training projects for many times.
Abstract	Industrialized cities create jobs and promote inclusive economic transformation through domestic manufacturing and commodity-based industrialization, thereby making cities more competitive and responsive to urban and demographic changes. It was characterized by a rapid decline in the share of manufacturing in total value added, while the share of services increased. These structural shifts, alongside market-based restructuring, required changes in cities' economies as well. Some cities managed to shift away from traditional manufacturing industries to service-oriented urban economies and gained economic attractiveness. In addition, reducing environmental risk and resource depletion while promoting sustainable development, a green economy can match the investment costs and economic benefits of carbon-intensive traditional models, while achieving far greater long-term social and

	environmental benefits. Increasingly, cities and countries divert from traditional urbanization models that rely on extensive resource extraction, waste, and pollution. Many types of infrastructure are ideal for green investments. These include energy, transport, wastewater treatment, waste management, affordable and green housing, and efficiency improvements for the private sector, including manufacturing, services, and commercial establishments. Logistics, capital flow and information flow run throughout the green economy in industrialized cities. Compared with capital and information flow, logistics is the most basic activity, and the scientific nature of logistics planning has a decisive impact on the overall benefit of enterprises. To realize Lean development and production of enterprises, it is necessary to understand the basic logic and effective tools of Lean. Lean thinking involves learning to find value, and a very useful approach is Value Stream Mapping, where all "value-adding" activities can be traced sequentially through a given operation, and where no value-adding action is taken. Lean logistics systems, enabling industries to ensure efficient production, provide on-time delivery, and increase customer value. PFEP (Plan for Every Part) is a key tool of Lean logistics system, which makes a detailed plan for every part in the production process and notes all the information related to the production process. This work presents the basic concepts and application of PFEP in the planning and operation of Lean logistics system, which can continuously optimize the logistics system of enterprises in an all-round way, improve the production efficiency of enterprises while reducing production cost.

Closing Session

Moderator: **Dr.Rémy LE BOENNEC &** Dr. HUA Xia

Time (Shanghai): 2023-11-23 18:10 - 18:35

Time UTC+1 (Paris): 2023-11-23 11:10 - 11:35

Conclusions & Perspectives & Announcement of Awards Winners of THNS2022

Fabien LEURENT, Professor, ENPC, Co-Chairman of THNS2023

PAN Haixiao, Professor, Tongji University, Co-Chairman of THNS2023

LUO Yanyun, Professor, Tongji University, Chairman of Award Selection Team of THNS2023

(THNS2023 awards selection will be conducted by the scientific committee, and the results will be published within one month after the event on https://THNS.tongji.edu.cn/)