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ENVISIONING SUSTAINABLE FUTURES FOR URBAN MOBILITY

COLLOQUIUM REPORT
MAY 2021

Anthropolis Colloquium | 25-26 March 2021

ENVISIONING SUSTAINABLE FUTURES FOR URBAN MOBILITY

Final Report | April 2021

On March 25th and 26th 2021, the [Anthropolis Chair](#) hosted the yearly colloquium entitled 'Envisioning Sustainable Futures for Urban Mobility'. With over 100 registrants, up to 50 participants and over 300 views on the livestreamed videos, the event has been a great success for the team of the Chair and will hopefully lead to many news insights, ideas, and partnerships.

On the first day, the sessions of Urban Mobility Futures and Mobility-as-a-Service in (Re)Evolution: Governance, Business Models & Opportunities set the context with three keynote presentations, two roundtables, and the presentation of the Anthropolis Chair's research and vision.

On the second day, the sessions Infrastructures of the Future and Sustainability Challenges for Innovation in Urban Mobility addressed innovations and future requirements of mobility infrastructures, and the challenges of sustainability in the field of urban mobility. Four keynote presentations and two roundtables provided a vast range of input and perspectives.

The Colloquium has been organised by the Anthropolis Chair of [IRT SystemX](#) and [CentraleSupélec](#). The Chair brings the partners EDF, Engie, Groupe Renault, Communauté d'Agglomération Paris-Saclay, and Nokia Bell Labs together to work towards human-centred urban mobility.

Partners of the Chair

COLLOQUIUM 2021

Programme

Seven keynotes and four roundtables over two days focused on various topics of urban mobility. Click on the sessions below to access the summaries.

The end of the document portrays the Chair's Vision and the Speakers' Biographies. On the YouTube Channel, all available recordings are accessible.

Day 1 | 25 March 2021

9:30

OPENING
Anthropolis Colloquium

10:15

KEYNOTE
Ole Jensen

11:00

Break

11:15

ROUNDTABLE
Urban Mobility Futures

12:00

Lunch Break

14:00

KEYNOTE
Guy Fournier

14:45

KEYNOTE
Maxime Audouin

15:30

Break

15:45

ROUNDTABLE
MaaS in (Re)Evolution

16:30

Day 2 | 26 March 2021

KEYNOTE
Katja Schechtner

KEYNOTE
Martin Dirnwöber

Break

ROUNDTABLE
Infrastructures of the Future

Lunch Break

KEYNOTE
Milena Klasing Chen

KEYNOTE
Jean-Pierre Ponssard

Break

ROUNDTABLE
Sustainability Challenges

URBAN MOBILITY FUTURES

Thursday, 25 March 2021 | 9:30-12:00

Opening Session (link to recording)

In the opening session of the Colloquium, Patrice Aknin, Scientific Director of IRT SystemX, and Bernard Yannou, Director of the Laboratoire Génie Industriel, CentraleSupélec, welcomed the participants and explained the starting point and ambition behind the Chair. The speakers highlighted interdisciplinary collaboration between industry, R&D, and academia, combining state-of-the-art technology projects in the Paris-Saclay area with human-centred and societal perspectives. The words of welcome were followed by an introduction by Chair holder Jakob Puchinger. He presented the different tasks and objectives of Anthropolis, the activities such as the joint seminar series with Beihang University, as well as connected initiatives such as the Future Cities Lab at Centrale Pékin, a cooperation between the Île-de-France and Beijing.

Session 1 | Urban Mobility Futures

The first session of the Colloquium introduced the broader level and addressed the topic of Urban Mobility Futures. This subject entered the second cycle of the Anthropolis Chair following initial research into scenario-planning before 2019 and now constitutes one of the four tasks.

Session 1.1 | Keynote Ole Jensen
Link to recording
Ole B. Jensen, Professor of Urban Theory, Aalborg University (Denmark), started with the keynote 'Futuring Mobilities in Times of Uncertainty' underlining that mobility is far more than transport from one point to another. In his presentation, he outlined some of the underlying concepts and ideas behind (staging) mobilities, infrastructural landscapes and futures perspectives, and showcased them in the case of airport cities. Further, Ole Jensen emphasised on some of the challenges of complexity, acceleration, and environmental destruction, and how they became even more evident, accelerated and spatialised in the context of the COVID-19 pandemic. On the topic of the global pandemic, Ole Jensen recently published the book 'The Epidemic Society' ('det Epidemiske Samfund). He concluded that we are in situation comparable with a pendulum, where some things are likely to go back to normal, other will never be the same, and most will be situated somewhere in between.

Session 1.2 | Roundtable
Link to recording
After a short Q&A session, the second part started: A roundtable discussion, moderated by Flore Vallet, Senior Researcher at the Anthropolis Chair. The speakers of the session were Marie Sevenet, Researcher at the European Institute for Energy Research (EIFER), Hervé Philippe, Senior Officer at the Innovation, Digital and Territories Task Force of the Directorate General for Infrastructures, Transports and the Sea, Ministry of Transport, Sébastien Goethals, Managing Director of Citilinks, and Tjark Gall, PhD Candidate at the Anthropolis

Chair. The session started by a short introduction of the work of the Chair, primarily on the work towards co-creating human-centred urban mobility futures in a territory and the meaning behind it. This was followed by opening statements of all external speakers.

Marie Sevenet presented the approach of the research at EIFER, focusing on Smart Urban Mobility which needs to be low carbon, fair, and inclusive, and combine various technological and societal solutions and interdisciplinary research to improve economic efficiency, the well-being of citizens, and air-quality, among others. She stressed the need to adapt and integrate technology with lifestyles and not the reverse.

Sébastien Goethals, architect and urban planner, presented some of the principles behind the work of Citilinks, focusing on different potentials of new forms of mobility, its governance, and spatial manifestation. Further, Sébastien pointed out that there is a 'dilution in both in space and time.' According to him, there are some modes of transportations which have been neglected in the past – primarily active modes – and that there is a need to rebalance and adapt the infrastructures, but also integrate new forms of mobility, react to the accelerating effects of COVID-19, and localise approaches to their global context.

Lastly, Hervé Philippe presented some of the work of the French ministry of transport. In particular, he presented the direction of the potential futures of autonomous vehicles, and the projects resulting out of the initiative, foremost the Atelier prospectif 'La vie robomobile', publications such as Prospective Atlas of the Robomobile Planet, and announced the upcoming Third Annual Rendezvous of Robomobile Life that will take place online on the 19-20 May 2021.

After the opening statements of all speakers, two questions were discussed:

1) How are urban lifestyles and urban mobility changing?

2) How can we localise and implement the sustainable mobility transitions?

Different reactions and ideas were brought forward by the speakers, ranging from the changing motivations and needs of mobility, the possible impacts of COVID-19, such as the increasing demand on urban logistics, but also the importance to embrace and return to some of the core functions of urban spaces, such as meeting and socialising in public space.

An interesting discussion arose from a comment by the previous keynote speaker Ole Jensen, questioning the possible combination of the 1,5 m society which resulted as a necessity of the pandemic, and the 15-minute city (advocated for by Carlos Moreno), which co-emerged as a concept at the same time. These partially contrasting yet complementary approaches steered the discussions back to core characteristics of cities, such as density or multi-functionality, but also highlighted positive outcomes of the pandemic, such as the (temporary) cycle lanes and road opening towards active modes around the work.

While there would have been much more to discuss, extend on and exchange with the audience, the session was closed due to time limitations. However, it has left us with many new impressions and topics to think about and just marked the start – both of the colloquium as well as of the work within the task of the Anthropolis Chair on Urban Mobility Futures. If you are interested in following the work, let us know by filling in a short minute survey.

1-min. Survey (French)
https://xt5b6v03n5o.typeform.com/to/yjAwZ4lI

1-min. Survey (English)
https://xt5b6v03n5o.typeform.com/to/P3NQ2m5s

MAAS IN (RE)EVOLUTION

Session 2 | Thursday, 25 March 2021 | 14:00-16:30

For session 2, dedicated to Mobility as a Service, we had the guests Guy Fournier (researcher in the AVENUE project and Professor at LGI, CentraleSupélec, and Pforzheim University), and Maxime Audouin (Mobility researcher and Head of Innovation Lab at Keolis). The two specialists of smart mobility shared their work and insights with the audience in two keynotes.

Session 2.1 | Keynote Guy Fournier
Link to recording

The first keynote by Guy Fournier was: "How to shape a mobility of the future which serves general interest? Potential emerging mobility services with automated vehicles and their related ecosystems in cities". In his presentation, Guy Fournier showed the analyses that were carried out in the framework of the AVENUE project. He further put the three governance models (private, public and coopetition models) into perspective. Some of the results on automated shared vehicles revealed that automated shared vehicles are likely to be a "game changer" for the futures of mobility in urban areas. The deployment of automated shuttles could catalyse multiple positive externalities, especially if the regulatory frameworks and tools are set up to enable certain governance schemes that prioritise sustainable and societal goals.

Session 2.2 | Keynote Maxime Audouin
Link to recording

During the second keynote, MaaS... what now? Identified challenges in the development of Mobility as a Service,

Maxime Audouin walked the audience through the evolution of MaaS and the key challenges this mobility scheme faces as of today. He indicated that "MaaS is not about technology, it is on Governance, but technology can be a bottle-neck."

Some of the challenges were territorial aspects such as local governance and the quality of the existing mobility supply. These are key elements to ensure that MaaS becomes a competitive mobility solution and shifts a substantial percentage of the modal share from the private car to mass or shared transport. Secondly, this shift will strongly depend on behaviour shifts, which are hard to measure. As third element is technology and technical readiness necessary in MaaS. Not all actors are ready to provide the same level of data – in quality and quantity. The fourth and last challenge mentioned is the business model chosen by MaaS operators and enabled by public authorities. The conclusions drew on public transport and public transport authorities having a big role to play in regulating and enabling the potential of MaaS solutions. Also, in the current pandemic context, MaaS might represent a great opportunity for public transport services to make a comeback as the backbone of a city's mobility structure.

Session 2.3 | Roundtable
Link to recording

The guests for the roundtable were: Julia Janke, Researcher at Ecole des Ponts ParisTech (ENPC) in charge of the project "MaaS as a regulatory tool";

Aurélien Belhocine, Head of Contracts, partnerships and digital services at Île-de-France Mobilités (IDFM), the French capital region's Public Transport Authority (PTA); Ashvar Abdoul Haime, Project Lead at Electricity of France (EDF); and representing the Chair, Mariana Reyes, PhD Candidate working on MaaS at IRT SystemX and LGI, CentraleSupéléc. The discussion between the roundtable guests was structured in three rounds. In the first round, the speakers presented their work and vision regarding MaaS' technological, organisational, and economical challenges while taking into account the French but also international context.

For Aurélien Belhocine, technological challenges are the main challenges they face currently. This is mostly due to the complexity of data management and interoperability needed to provide the same quality in the user experience to all users. Further, organisational challenges were mentioned, such as the need to create and develop the right contractual tools, as well as economical constraints related to high costs to build platforms. For Julia Janke, one of the main challenges is the definition of the intermediate role played by micromobility. In addition to the definition of their role, the question of subsidies came to the table. There is no consensus yet if these modes need or merit subsidies, how much, and how to justify that. Ashvar Abdoul Haime highlighted technological barrier in the development of infrastructure for charging stations. Standardisation is an issue when planning to cover or fulfilling charging needs for most vehicles. He further highlighted that "we need as many MaaS as existing territories", raiding the aspect of territorial MaaS customisation.

The second question was: *Who should take the role as the MaaS operator? What should be the value creation configuration?*

Governance issues were brought up in relation to the roles that stakeholders should take in different situations. Further, the speakers raised the need to implement adapted regulatory scenarios to convey better results from the collaborative work between stakeholders. Aurélien Belhocine shared his strategy to achieve what IDFM called a "MaaS as a public service". IDFM's role as the public transport authority would lead the way with this MaaS solution and would also enable cooperation with several other private mobility providers to act as complements of the MaaS offer in this territory. The speakers mentioned that the right regulatory environment will be a crucial element to consider the different stakeholders' interests that are part of the MaaS ecosystem. This also highlights the importance of the role of national governments in the creation of strategies and roadmaps to facilitate the decision making and the deployment of MaaS solutions.

The session concluded with the consensus on the need to enhance collaboration at different levels through diverse actions, such as the opening of data and standardisation of information. This can build the foundation to build an urban mobility context that is based on principles of complementarity which in return need solid policy guidelines to be set up.

INFRASTRUCTURES OF THE FUTURE

Session 3 | Friday, 26 March 2021 | 9:30-12:00

Session 3.1 | Keynote Katja Schechtner

The first keynote of the second day was presented by Katja Schechtner, who works at the MIT Senseable City Lab and HDM Stuttgart. Under the title "Governing Transport in the Algorithmic Age", the presentation started with the statement that the mobility infrastructures no longer consist only of sidewalks, streetlights, and bridges. Instead, it also includes the codes and algorithms that the operation of mobility systems relies on. She then pointed to the increasing influence and consequential outcomes of codes and algorithms on society; especially during the COVID-19 crisis when delivery services were heavily used. The focus was then put on the role played by software in all kinds of transportation systems including maritime and air transports.

In Katja Schechtner's view, it is necessary to make sure that the algorithms perform well regarding their objectives but also integrate them properly in the overall mobility system. She argues that we need to be concerned by the safety of algorithms – particularly in automated vehicles – but also need to look beyond it to assess other potential impacts. She insisted on the challenges linked to the skills that public authorities and the regulator must have to grasp the challenges linked to technical-scientific developments. The ability to clearly explain AI-based systems remains an issue. Further, privacy risks have to be considered as algorithms become more effective at extracting and interpreting massive amounts of data. The presentation went further in depth on the relationship between law, regulatory processes, and algorithms, resulting in three questions:

1) *Machine-readable code:* Converting analogue regulations to a machine-readable format can be complex and the leading actor in this matter on an urban scale is the city of Los Angeles with its mobility data specification project.

2) *Regulating by algorithms:* Technology can be used to dynamically regulate transportation based on changing situations (e.g., changing speed limits that we often find in highways).

3) *Regulating algorithms:* 21st century regulation needs be done through guiding and iterating while considering the continuous innovation using regulatory strategies: adaptive regulation, regulatory sandboxes, outcome-based regulation, risk-weighted regulation, collaborative regulation.

Katja Schechtner concluded with an emphasis of the importance of imagining desirable futures – despite the difficulty of the exercise – as it enables us to move forward.

Session 3.2 | Keynote Martin Dirnwöber

Link to recording

In this second keynote of the day, Martin Dirnwöber, affiliated with AustriaTech, gave a keynote on the (future) role of digital infrastructures for efficient, safer, and more sustainable mobility systems. In his opinion, the rise of new digital technologies, ranging from con-

nectivity, to AI-based perception tools, to cloud automation platforms, enable digital twin-like infrastructures mirroring the physical ones. He highlighted that such digital twin capabilities, as in the INFRAMIX project for highways, could help prevent bottlenecks in highways, anticipate roadworks and construction sites, or could provide dynamic lane assignment (even speed recommendations) to a fleet of automated vehicles (not autonomous). The INFRAMIX project, and all similar initiatives, surfaced the need for mobility systems to gain systemic-level vision that would provide ultimately collective gains, instead of selfish, individualistic gain for each vehicle. Such capabilities can be leveraged for motorways but also city environments, with notifications of signalised intersections, hazardous location notification, in-vehicle signage, road works warning, etc.

Martin concluded that the roles and responsibilities of digital infrastructure will need to be further investigated in the future, as well as legal and operational elements to be clarified. Notably, new companies will be formed to work at this intersection between physical and digital infrastructures, and different business models will see the light in consequence. Regarding the lack of flexibility of such infrastructures, Martin's view is that "the bigger problem is the management – more than the technology itself."

Session 3.3 | Roundtable
The panellists for this roundtable were: Eric Lacombe, Head of Mobility Partnerships at Nokia Bell Labs, Adam Abdin, a Post-Doctoral Research Fellow within the Future Cities Lab, and Yann Briand, responsible for the mobility domain at IRT SystemX.

Each participant went on to present their opinion on key enablers of future infrastructure: governance was cited multiple times, notably on the role of public-private partnerships and how new delegation models might appear. Public regulation, as well as future usage patterns were also discussed, highlighting a key success factor of how infrastructure can become more digitalised to provide starting answers on those two factors (dynamic regulation policies enabled by technology, and increased visibility over offer / demand ratio). The role of technology was also discussed by all participants, with the observation that technology companies have increasingly taken on administrative and infrastructure responsibilities that governments have long fulfilled. The roundtable ended with a final closing remark: future infrastructure, whether technology-enabled, shouldn't replace the need for better policies and more funding to solve some of the most pressing urban issues.

SUSTAINABILITY CHALLENGES FOR INNOVATION IN URBAN MOBILITY

Session 3 | Friday, 26 March 2021 | 14:00-16:30

Session 4.1 | Keynote Milena Klasing Chen

Link to recording

Milena Klasing Chen first delivered a keynote titled "Sustainable mobility through business action". After introducing the six major programs of the World Business Council for Sustainable Development (WBCSD), she focused on the Cities and Mobility program and shed light on the involvement of businesses in making mobility more sustainable. Then she illustrated how the engagement to zero carbon emission could be operated through corporate fleet management. Finally, Milena emphasised the Corporate Mobility Pacts, an initiative to catalyse public-private collaborations with cities towards sustainable mobility. The 2019 case study of Lisbon was showcased, where coalitions were created, and more than 26 actions were implemented (e.g., increasing corporate chargers or bike parking spaces). She concluded with the changes of plans which also occurred due to the COVID-19 pandemic.

Session 4.2 | Jean-Pierre Ponssard

Link to recording

The second keynote was given by Jean-Pierre Ponssard on the topic "The challenge of hydrogen mobility: Combining local and global cooperation". Compared to electric motorisation, hydrogen offers higher range in km travelled. He introduced pioneering projects in Germany and France and emphasised the need to reduce transaction costs among players. He demonstrated the role of policies at local (region or country) and global (European) scales to encourage the deployment of hydrogen vehicles and recharging infrastructures. Regarding resource consumption, fuel cell place pressure on platinum while batteries tend to pressure lithium resources. He concluded that hydrogen seems a promising solution for trucks, trains, and buses, as evidenced by several ongoing European projects.

Session 4.3 | Roundtable

Link to recording

The guests for the last roundtable of the colloquium were: Cyrille François, Post-doctoral Researcher at Laboratoire Ville Mobilité Transport, Pont Paris Tech; Stéphanie Jumel, R&D Programme Manager at EDF in charge of electric and hydrogen mobility projects; Alexandre Vaudrey, Senior Lecturer at ECAM Lyon, University Lyon, specialist of efficiency of biogas and hydrogen motorisations; and Flore Vallet, Senior Researcher at the Anthropolis Chair.

The roundtable was organised around two main questions:
1) What is the relevant scale to tackle sustainable mobility?
2) How to envisage future studies towards sustainability? What are the major stakes, uncertainties?

For the first round, Stéphanie Jumel positioned the work on the electromobility plan as a systemic global approach developed at a national and electricity network scale. Alexandre Vaudrey add-

ed that for energy, all scales are intricated: full decarbonation may happen at a super local scale (house) or neighbourhood scale. Cyrille François conducts his research work at the scale of current and future districts to find local mobility solutions, as well as at the scale or urban areas. His approach addresses mobility as a social, environmental, and economic matter. The Anthropolis Chair emphasised the user or citizen scale associated with the usage of mobility services.

For the closing round, the discussion made an echo to the special issue for Sustainability journal called "Reconciling High tech and Low tech for Sustainable urban mobility". The exchanges elaborated on the need to feed sustainability debates in a balance between the resurgence of older – and even ancient – technologies and practices for mobility (like boats and horses) and the development of technological solutions like automated vehicles.

INTRODUCING THE ANTHROPOLIS CHAIR VISION

Introduction

As shown on the figure below, the research plan of the chair is organised according to three interconnected themes (Urban Mobility Futures; Mobility as a Service and Infrastructures). An addition transversal topic is addressing Sustainability Challenges for urban mobility. Based on this scheme, the chair presented its research agenda during the colloquium.

Sustainability Challenges

This part of the contribution is placed under the umbrella of Sustainable Development Goal 11 – Sustainable Cities and Communities. Our goal is set by the Paris Agreement with the Zero Carbon Emission target in 2050. A part of the long-term strategy to reduce Green House Gases Emissions is the Paris ban on combustion and diesel-fuelled engines by 2030.

In our work, we intend to balance and examine sustainable value creation as well as negative (environmental and social) impacts generated by mobility solutions. We also consider resources in a broad sense, meaning material and energy, as well as data flows.

A special interest is placed in social impacts when building future scenarios for mobility and urban life, and more specifically the expected equity of scenarios for different social groups.

Regarding value creation, the sustainability of MaaS business models is taken into account, as well as the privacy when using mobility data. Another emerging topic concerns the quantification of environmental impacts associated with mobility data along their life cycle, i.e., data production, storage, and analysis.
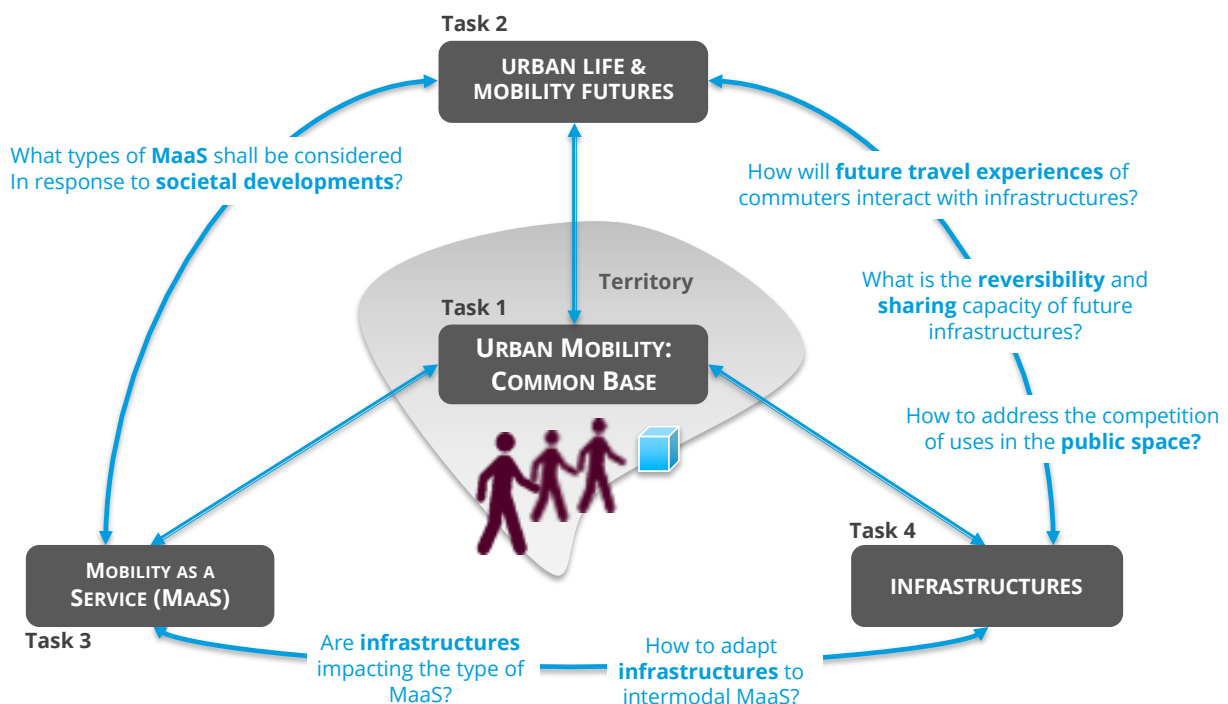
For the infrastructure theme, we focus on the joined environmental impacts of infrastructures and vehicles, for instance in the case of electric mobility. Our intent is to consider more impacts than greenhouse gas emissions or energy consumption to better embrace the diversity of impacts generated. We combine eco-design and transport approaches with a spatialised vision, considering mobility practices in the model. Finally, in line with the special issue for Sustainability journal called "Reconciling High tech and Low tech for Sustainable urban mobility", we discuss the sustainability challenges jointly raised by the usage of high-tech solutions for mobility (for managing data for instance) or low-tech solutions mostly based on usage shifts.

Urban Mobility Futures

The second task of the Anthropolis Chair expands on the future methods' research and personarrative approach of the first cycle of the Chair; responding to the question of how the future of urban mobility may look like and how we can prepare, plan, or impact its materialisation. The goal is to find new pathways to contribute to a sustainable transition towards more human-centred mobility in the urban areas of tomorrow.

The specific objectives are to create a state-of-the-art overview on foresight and forecast methodologies; to compile and to analyse impacting societal, behavioural, and technological trends; observe individuals' needs, behaviours, and preferences through theoretical and participatory research; and finally, develop a systematic and creative method for alternate future scenarios of urban mobility. These methods and

tools shall be applied in the Communauté d'agglomération Paris-Saclay and lead to multiple, human-centred, and place-based urban mobility scenarios which can guide and support product, service, and policy design.

Mobility as a Service

The vision of the Anthropolis Chair on Mobility as a Service (MaaS) starts by emphasising the place that MaaS could take in the futures of urban mobility as a human-centred mobility solution.

We are building our MaaS research on economic, social, and technological axes, as well as the transversal axis eco-innovation. In the economic axis we propose to analyse value creation, capture and redistribution models as well as the overall value chain restructure in the ecosystem for sustainable MaaS' solutions. We are creating a typology of business models that permits us to further examine more scaled and territorialised MaaS deployments and its outcomes and to create more specific indicators for the evaluation of these criteria. In the social axis we seek to identify the aftermaths of governance dynamics in reconfiguration and MaaS' societal effects regarding equity of access to mobility through MaaS, issues of spatial justice in the public space, sustainability, and health impacts. In the technological axis we approach the issues of creation, ownership, and management of data by all the services integrated in MaaS solutions. We further assess the role of parallel technological innovations in the evolution of MaaS, for example how infrastructure will be integrated as well as new mobility services like automated shuttles or charging networks for electric vehicles

Exploring MaaS from an ecosystemic approach, we have come up with initial research goals:
• To identify the status of MaaS definition and monitor and map its evolution.
• To clarify the effects of governance configurations on the value chain in the ecosystem.
• To identify the sustainable outcomes of MaaS business models to assess them and provide recommendations to stakeholders.

We are keen to identify the policies and regulations that might enable a more successful merge between innovation and sustainability in MaaS, in other words, assure that MaaS solutions will be developed under an eco-innovative approach.

Lastly, we want to approach the scenarios of urban mobility futures and model what MaaS could look like in these scenarios.

Further, we started working on the appraisal of active modes in MaaS towards more sustainable MaaS business models that promote walking and cycling and provide an added value to customers and to MaaS operators. Some of the next steps in our research include identifying methods and tools that will permit us to assess MaaS under a series of sustainability criteria as well as under technological and organisational perspectives. Regarding this, we are mapping MaaS actors and create a topology of the new economic dynamics and governance configurations between them.
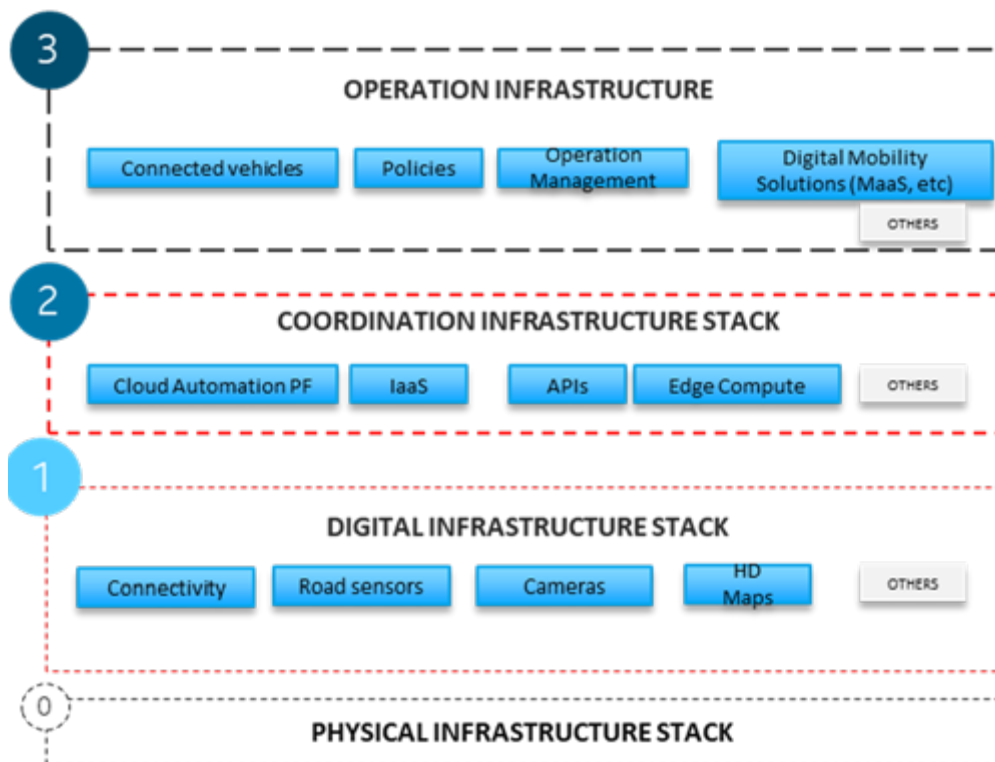
Infrastructures

We believe the future of infrastructure will be more digitally enabled and will contribute to helping the most people move safely, sustainably and with maximum convenience.

In a preliminary schematic representation, the Anthropolis chair pictures four layers of infrastructures sitting on top of each other, each providing cumulative new features to the precedent:

• The physical infrastructure layer, composed of all physical capabilities.
• The digital infrastructure, with perception, capture and communication technologies.
• Augmented then by the coordination infrastructure layer, composed of cloud automation platform technologies to visualise and simulate upon the collected data, and derive personalised recommendations.

• Finally, the operational infrastructure layer, composed of user-facing core components such as mobility services or connected vehicles, as well as fleet management tools.

Such figure provides a framing to think how future infrastructures can contribute and improve existing ones with new additional digital capabilities. A guiding question we ask ourselves is "what is the desirable distributions of roles between infrastructure & vehicles for a human-centred perspective". Preliminary axis leads us to study the tangible benefits infrastructure-supported vehicles can bring in different settings (safety, throughput, efficiency, systemic outputs ... in highway lane or urban zones for instance), as well as question the governance and emerging business models between each and within each layer of the stacking.

Preliminary representation of "infrastructures" stacking

SPEAKERS' BIOGRAPHIES

In order of appearance.

Patrice Aknin
Scientific Director, IRT SystemX

Patrice Aknin manages the scientific arm of the Institute by supporting and assisting its scientific growth and coordinating relationships with its partners in public research and higher education. A PhD of Université Paris-Sud and "Habilitation à diriger des Recherches" of the Ecole Normale Supérieure in Cachan, his career was one of research at Inrets, later known as Ifsttar (French Institute of Science and Technology for Transport, Developpement and Networks). In 2008 he was appointed Research Director at Ifsttar. In 2013, he was appointed Scientific Director of the SNCF in the Innovation & Research division, in charge of the group's doctoral studies, academic partnerships, expert network and innovative design. He is currently a professor at Ecole des Ponts ParisTech.

Bernard Yannou
Director of the Industrial Engineering Laboratory (LGI), CentraleSupélec

Bernard Yannou is a Distinguished Professor of Engineering Design and Director of the Industrial Engineering Research Department (Laboratoire Génie Industriel, LGI) at CentraleSupélec. He received an M.Sc. (1988) in Mechanical Engineering from Ecole Normale Supérieure of Cachan (ENSC), an M.Sc. (1989) in Computer Science from Paris-6 University, and a Ph.D. (1994) in Industrial Engineering from ENSC. His research interests are design automation, design management / methodologies / new product development, value and user-centered design, artificial intelligence and computers in design, system thinking and engineering, design under uncertainty, decision-based design, innovation engineering, sustainable design, and industrial ecology, and multidisciplinary design optimization.

Jakob Puchinger
Anthropolis Chair Holder at IRT SystemX and CentraleSupélec

Jakob Puchinger is responsible for the research axis Scientific Computing and Optimization at IRT-SystemX as well as Professor of Industrial Engineering and responsible for the Operations Management team at the Industrial Engineering Research Department at CentraleSupélec and co-director of the Futures Cities Lab at Centrale Pékin. His main research interests are in urban logistics, human centered innovation for urban mobility, disruptive technologies and algorithmic optimization of the underlying transport systems. After completing his doctoral studies at the TU Vienna in 2006, Jakob Puchinger worked at the NICTA Research Centre at the University of Melbourne. He joined the Austrian Institute of Technology in 2008 where he became head of the business unit Dynamic Transportation Systems in 2014. Jakob Puchinger additionally held a position as external lecturer at TU Vienna, regularly offering a course on optimization methods for transport logistics. Jakob Puchinger is the author of more than 70 scientific publications.

Ole B Jensen
Professor of Urban Theory, Aalborg University (Denmark)

Ole B. Jensen is Professor of Urban Theory at the Department of Architecture, Design and Media Technology, Aalborg University (Denmark). He is deputy director and co-founder of the Centre for Mobilities and Urban Studies (C-MUS). He is the author of Staging Mobilities, Routledge, 2013, and Designing Mobilities, 2014, Aalborg University Press, the Editor of the four-volume collection Mobilities, Routledge, 2015, and author (with Ditte Bendix Lanng) of Mobilities Design. Urban Designs for Mobile Situations, 2017, Routledge, co-editor of the Routledge Handbook of Urban Mobilities, 2020 (with Claus Lassen, Ida S.G. Larsen, Malene Freudendal-Pedersen and Vincent Kaufman), and Det Epidemiske Samfund (The Pandemic Society), 2020, Hans Reitzel (with Nikolaj Schultz).

Flore Vallet
Senior Researcher, Anthropolis Chair

Researcher on Human Centered Design at IRT SystemX and Assistant Professor at CentraleSupélec. Before, she was assistant professor at the Mechanical Systems Engineering Department of the Université de Technologie de Compiègne (UTC). She graduated in mechanical engineering design at the ENS Cachan (1993), and obtained a Master's degree in industrial design from UTC in 1999. In 2012, she completed a PhD on the dimensions of eco-design practices towards education of engineering designers. She is a member of the French EcoSD (Eco-Conception de Systèmes Durables) network and of the Design Society. Her fields of interest are practices of eco-design and eco-innovation in industry and for education, human centered approaches in design and eco-design.

Sébastien Goethals
Managing Director, Citilinks

Sebastien Goethals is an urban planner, architect and urban mobility entrepreneur from Belgium that has worked globally on the physical and digital transformation of urban environments with a people-centered approach. He has founded Citilinks in Shanghai and Rotterdam to build multidisciplinary teams working on the integration of mobility systems, design innovation, seamless intermodality, street metabolism and urban governance at various levels in East Asia, Europe and Africa. He advises and delivers projects and studies for municipalities, mobility service platforms, industries and transport authorities in terms of adequate transport policies, sustainable mobility planning, mass transit, automation, shared-used vehicles and multimodal solutions from a design-sensitive angle. He has been director of technical assistance of ISOCARP from 2017 to 2020.

Marie Sevenet
European Institute for Energy Research

Dr Marie Sevenet received her diploma in Geography and Urban Planning from the University of Nice Sophia Antipolis (France) in 2005. Since 2010, she has been working as a researcher at the European Institute for Energy Research (EIFER) in Karlsruhe in the field of modelling and simulation of energy in urban planning. In 2013, she defended her Doctoral Thesis at the University of the Nice Sophia Antipolis (France) on the impact of urban form in 3D on the sustainability. At her work at EIFER she is developing new spatial methodology based on GIS and statistics for two activities. She is working on several methodologies to well understanding the energy problematic in the urban planning. Her main thematic are spatial analysis and modelling, urban model, mobility & accessibility and fuel poverty. On those topics, she has contributed to several EDF R&D projects and Public Funded project at European and National Level.

Hervé Philippe
Ministry of Transport

Hervé Philippe is Senior Officer at the Innovation, Digital and Territories Task Force of the Directorate General for Infrastructures, Transports and the Sea, Ministry of Transport. He is in charge of Artificial Intelligence in the field of transportation, Intelligent Transport Systems, and autonomous vehicles. He started as a researcher in the field of robotics and AI (LAAS-CNRS) and road pavements network monitoring and management (LCPC, now Université Gustave Eiffel). Afterwards, he was deputy head of the Val d'Oise (95) local agency of the French Ministry of Transport. Hervé Philippe has been working for 10 years in China, first as the resident director of ParisTech in China, based in Shanghai, then as the founder of a consulting company in the field of Transport.

Tjark Gall
PhD Candidate, Anthropolis Chair

Tjark Gall is pursuing a PhD on the topic of developing human-centred scenarios of Urban Mobility Futures. He is an urbanist with a strong interest in urban development, climate change impacts for urban residents, and the effective use and visualisation of urban data to strengthen evidence-based decision- and policymaking. He obtained a MSc Urban Management and Development Studies course at IHS, Erasmus University Rotterdam (NL), and MSc Architecture at the Technical University of Brunswick (GER). Before starting his doctoral research, he worked as project manager for the research branch of the International Society of City and Regional Planners (ISOCARP) on the EU H2020 Project +CityxChange. His research interest and publications span urban mobility, futures studies, social sustainability, indicator-based assessments, mapping of risk, and development frameworks.

Maxime Audouin
Mobility researcher and Head of Digital and Innovation Lab at Groupe Keolis

Maxime Audouin is known for his previous research on smart mobility governance. He has authored several publications including « The Governance of Smart Mobility » (Springer, 2018); and « The development of Mobility-as-a-Service in the Helsinki metropolitan area: A multi-level governance analysis », in Research in Transportation Business and Management (2018). In His PhD, conducted in the Chaire Management of Network Industries at EPFL, headed by Prof. Finger, he looked through a qualitative and case-based inquiry at the roles public authorities are playing in the development MaaS-like schemes, using governance and socio technical transition literatures. He now works in the private sector as head of the Digital and Innovation Lab for Keolis Group.

Guy Fournier
Professor, Pforzheim University, LGI, CentraleSupélec

Guy Fournier is Professor affiliated to Pforzheim University in Germany and an expert in sustainable mobility. French born and equipped with a German Doctorate Degree; he has worked primarily in the technology sector in several countries in Europe prior to joining academia. His core interest and expertise rests within international economy, sustainable development and new innovative business models with electric vehicles and autonomous vehicles. He has guided municipalities and companies of German industry towards more eco-friendly and sustainable approaches to energy consumption and mobility, engaging users and producers of cars and to make mobility truly sustainable and economically viable. He is currently working on a Horizon project to design and carry out full scale demonstrations of urban transport automation by deploying, for the first time worldwide, fleets of autonomous mini-buses in low to medium demand areas of 4 European demonstrator cities: Geneva, Lyon, Copenhagen and Luxembourg, and 3 replicator cities. In 2012 he got the Award of excellence in teaching from the engineering faculty and the University of Applied Sciences in Pforzheim and in 1994 the Award of best PhD in Germany from SEL-Alcatel Stiftung für Kommunikationsforschung (Stuttgart). He was responsible for international development of the Engineering faculty and author of many contributions to journals and books.

Julia Janke
Researcher at Ecole des Ponts ParisTech (ENPC)

Julia joined the LVMT (Laboratoire Ville Mobilité Transport) and LATTS (Laboratoire Techniques, Territoires et Sociétés) in October 2020 as a researcher and post doc as part of the Research Chair "Regulation of the city of tomorrow" between École des Ponts ParisTech and RATP group. In this projet, she compiles a census of MaaS platforms and develops methods and instruments to evaluate the impact of MaaS platforms on urban transport systems. This project is co-directed by Virginie Boutueil (LVMT, ENPC) and François-Mathieu Poupeau (LATTS, CNRS). Previously, Julia obtained her PhD in transport economics and planning at the University of Technology in Vienna (Austria) and studied travel behavior change as a one-year guest researcher at the Institute of Transportation Studies at the University of California (Davis, US).

Mariana Reyes
PhD Candidate, Anthropolis Chair

Researcher and PhD candidate on "Mobility as a Service: Concepts, governance and business models." Mariana has a degree in Architecture and a diploma in Urban Planning and Management of Metropolitan Mobility in Mexico. She joined the Chair in November 2020, after completing a MSc in Urban Planning, Transportation and Mobility at the Ecole d'Urbanisme de Paris (UGE-ENPC) with the research topic of "Governance of Mobility as a Service and its effects on public transport systems".

Aurélien Belhocine
Head of Contracts, Partnerships and Digital Services at IDFM

Aurélien Belhocine is in charge of contracts and partnerships for MaaS projects at Île-de-France Mobilités. His mission is to bring the various stakeholders together and to put in place the right contracts within the MaaS ecosystem. He has a master's degree on Metropolitan Strategy and Governance at SciencesPo Bordeaux and prior to joining île-de-France Mobilités, Aurélien worked in the smart city and urban A.I field with the startup Qucit.

Katja Schechtner
Research Fellow, MIT Senseable City Lab and Visiting Professor, HDM Stuttgart

Katja Schechter is an Urban Scientist at OECD and MIT and recent Finalist at Fast Company Award 2018 World Changing Ideas with the project ADB Pedicab - Buddha Pedal Power. She works as an Urban Scientist at OECD in Paris, as a researcher at MIT Media Lab and as a speaker and consultant across Asia, Europe and the US. With homes in Vienna, Paris and Boston, she is a global urban nomad, bringing together people and bridging cultures – in science, finance and arts.

Ashvar Abdoul Haime
Project Lead at EDF

Ashvar Abdoul Haime, Project Lead on Autonomous & Electric Mobility at Electricity of France (EDF), is currently working on hot topics such as autonomous vehicles, autonomous charging technologies, charging infrastructure and related services. Ashvar holds a master degree in Electric and Electronics Engineering at École Polytechnique Fédérale de Lausanne (EPFL). Prior to joining EDF, he worked in R&D, Energy sector Consulting and in the Startup Ecosystem.

Martin Dirnwöber
Business Unit Digital Infrastructure & Data, Austria Tech

Martin Dirnwöber works on topics such as rapid development in areas like Automated Driving, Shared Mobility or Mobility as a Service. These will facilitate new and promising mobility solutions. Coordination will be essential to fully exploit the potential of these solutions and to avoid negative effects. His presentation addressed Digital Infrastructure as a key element for coordination and support of new mobility solutions.

Adam F. Abdin
Future Cities Lab – CentralePékin – CentraleSupélec

Adam F. Abdin is currently a Post-Doctoral Research Fellow within the Future Cities Lab., a joint research lab at Centrale Pékin, in collaboration with Beihang University and CentraleSupélec. He is also attached to the research group on "Risk and Resilience of Complex Systems" at the Laboratory of Industrial Engineering, CentraleSupélec, University Paris-Saclay, France. Adam F. Abdin's research is focused on developing techno-economic modeling and optimization frameworks for improving the resilience of complex engineering systems, critical infrastructure systems and interdependent systems, against failures. Most notably, the development of methodological frameworks combining data analytics approaches and robust optimization techniques to improve the robustification and emergency response strategies of infrastructure systems against different hazards. Adam F. Abdin obtained his Ph.D. degree in Engineering of Complex Systems from CentreSupélec, University Paris-Saclay, for the research work done within the "Chair on Complex Systems and the Energy Challenge" of the European Foundation for New Energy of Electricite de France (EDF).

Yann Briand
Innovation and R&D manager, Mobility Sector Leader at IRT SystemX

Yann Briand is manager at IRT SystemX, responsible for the mobility domain. Yann takes part in the setting up and coordination of R&D collaborative activities, supported by internal teams experts in different technologies such as Artificial Intelligence, machine learning, massive data valorisation, modelling and simulation, blockchain, or services' design. Yann Briand contributes in the mobility sector for more than 10 years, supporting industrials and academics in their innovation programs. Yann Briand is a graduate of the Ecole des Mines and Sciences Po.

Edgar Ke
Mobility Innovation and Deeptech Startups at Nokia Bell Labs and Anthropolis Chair

Edgar Ke is the Mobility Innovation & Startup Manager at Bell Labs in France. He leads the technological & market watch activities in mobility, staying up to date on new developments & trends in urban mobility. He also works on the business modelling & valuation related to new mobility ventures at Nokia Bell Labs.

Eric Lacombe
Nokia Bell Labs

Eric Lacombe is the Head of the Global innovation ecosystem France. He leads the development of new strategic partnerships in the field of mobility, having fostered an ecosystem of more than 20 players since inception. He also leads the ecosystem coordination of Nokia Bell Labs' new ventures in mobility, bringing to business value new road infrastructure solutions based on innovative technological assets.

Tarek Chouaki
PhD Candidate at Anthropolis Chair – IRT SystemX and LGI, CentraleSupélec

Researcher and PhD candidate on Stochastic Optimization and Reinforcement Learning for the design of an on-demand mobility service by simulation at IRT SystemX and Laboratoire Genie Industriel. Tarek Chouaki obtained a Master's degree in Artificial Intelligence from Sorbonne Université in 2019. His major fields of interest are Artificial Intelligence and Multi-Agent Systems.

Milena Klasing Chen
Manager, Mobility, World Business Council For Sustainable Development (WBCSD)

Milena Klasing Chen is Manager for Mobility at the World Business Council for Sustainable Development. Together with more than 200 leading businesses, she works to accelerate the transition to a sustainable world. She holds a PhD in innovation management and has contributed to develop innovation models for low cost design and to research on public transport. She is the author of "Innover avec le low cost. Le cas du transport public" (Presses des Mines, 2017)

Jean-Pierre Ponssard
CNRS-CREST Ecole Polytechnique, Chair Energy and Prosperity

Jean-Pierre Ponssard is emeritus research director at CNRS and associate research fellow at CIRANO. His fields of research concern economics of environment, industrial organization, and game theory. He recently co-edited two books Corporate Social Responsibility: from Compliance to Opportunity (with Patricia Crifo) and Economie du climat : Pistes pour l'après Kyoto (with Olivier Godard). Jean-Pierre Ponssard was professor of economics at Ecole Polytechnique and the head of the Laboratoire d'économétrie. He currently leads the "Business Sustainability" Research Project at Europlace Institute of Finance (EIF). In 2010 he received the excellence award from CNRS. He holds a PhD from Stanford University, and an engineer degree from Ecole Polytechnique.
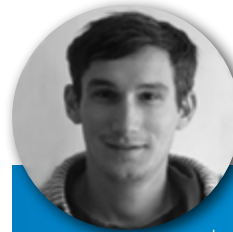
Cyrille François
Post [LVMT, ENPC]

Postdoctoral researcher at the Laboratoire Ville Mobilité Transport (LVMT), Cyrille focuses on the environmental issues of daily mobility. He does not consider mobility as the simple use of transport technologies but as a social artifact anchored in a specific territory, combining life cycle analysis approaches as well as tools and methods to represent mobility (urban models or surveys).

Stéphanie Jumel
Electric Mobility R&D Program Manager, EDF Lab Paris Saclay

Stéphanie is interested in clean energy solutions, materials, and modelling , with a 15-year professional experience in utility industry including leadership roles in technology, software development, and strategic planning. She has a deep expertise in running multi-disciplinary R&D teams and projects, joining academic and business partners. She also developed experiences with start-up companies and was the co-founder of an innovation consultancy group.

Alexandre Vaudrey
Senior Lecturer (PhD), ECAM

After broad experience working on the heat management of fuel cells, electrical machines, and heat engines, Alexandre now works on the practical implementation of advanced control strategies (mostly based on Predictive Functional Control) on thermal machines, mostly HVAC&R ones. He is interested in the efficiency of different types of motorisations for mobility applications.

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The Anthropolis Chair, operated by IRT SystemX and CentraleSupélec, brings together the partners EDF, Engie, Groupe Renault, Communauté d'Agglomération Paris-Saclay, and Nokia Bell-Labs to work towards human-centred mobility. The Future Cities Lab is a joint initiative of Centrale Pékin, Beihang University Beijing, and Laboratoire Génie Industriel (LGI), CentraleSupélec, Université Paris-Saclay. To get to know more about ongoing activities, visit the Chair's website and join the mailing list.

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