

rijksuniversiteit groningen

June 25, 2019

INNOVATION AGENDA

SMART MOBILITY

University of Groningen

CONTENTS

Introduction 2
Aim of the innovation agenda 2
Smart mobility 2
Themes of the University of Groningen innovation agenda Smart mobility 3
Sustainability 3
Approach 4
Participating Faculties 4
Theme 1: Open sharing networks 5
Mobility as a shared service 6
Physical Internet 6
Last mile operations 6
Sharing infrastructure to enable emission free transport 6
Examples of current research projects 7
Theme 2: Governance models 8
The role of the government 9
Stakeholder behavior 9
Shared values 9
Legal protocols 9
Examples of current research projects 10
Theme 3: Business and organization models 11
Responsibility 12
Safety and security 12
Competition and collaboration 12
Information connectivity and services 12
Examples of current research projects 13
Theme 4: Smart solutions 14
Adaptive infrastructure 15
Technology 15
Planning, design and control concepts 15
Acceptance and adoption 15
Examples of current research projects 16
Educational programs 18
Involved researchers 19



Introduction

Aim of the innovation agenda

The University of Groningen stimulates interdisciplinary research, and facilitates a unique environment for collaboration between different disciplines and innovation projects with societal partners. We intend with this innovation agenda to present our research plans in the area of smart mobility to be performed in cooperation with relevant stakeholders. We invite companies, non-profit organizations and governmental organizations to contact us (via industryrelations@rug.nl) to explore opportunities to connect, to find synergies, and to take mobility in the Netherlands with us to the next level.

Smart mobility

Smart mobility involves the efficient and sustainable movement of freight and people in open and connected networks in urban areas and low-density regions using innovative digital technologies and solutions. Specifically, we distinguish the following four key aspects in smart mobility 1) the role of smart modes of transportation (e.g., vehicles and vessels), 2) the role of smart infrastructure and the connection with the environment; 3) the role of vehicle and freight communication and data and 4) the role of smart tools for design, planning and control. Smart mobility studies require people, private and public perspectives. The transformation to smart mobility systems entails wide scale system changes requiring input from disciplines as business, behavioral and social sciences, law, spatial sciences, philosophy, mathematics, logistics and computer science.

Namely, new smart solutions and technologies need to be designed to provide effective and resilient information systems for sustainable transportation of people and freight. This requires, among others, the design of new algorithms enabling planning and control of operations in open and connected mobility networks. The adoption and development of new technologies, concepts and systems require careful designed institutions and governance to function safely and responsibly within current and future legal frameworks and must realize broadly accepted ethical values. Open and connected networks enable the introduction of sharing concepts. New technologies and system changes need to be acceptable to different user groups in different spatial contexts and scales, and we need to understand which factors affect the likelihood that they will be adopted and used as intended. New technologies in this field involve the development of adaptive infrastructure and innovative solutions alongside the development and organization of space.

Themes of the University of Groningen innovation agenda Smart mobility

Our innovation agenda consists of four themes to study smart mobility in sustainable open and connected mobility and logistics networks by focusing on the four key elements of smart mobility as defined above, namely smart modes of transportation, infrastructure, tools and information systems from a people, private and public perspective.

1. Open sharing mobility and logistics networks
2. Governance in smart mobility networks
3. Business and organization models
4. Smart solutions

The key themes of the Dutch Smart Mobility Agenda of the Ministry of Infrastructure and Water Management are legislation and regulations, infrastructure and collaboration. As shown below in each of the themes of the innovation agenda of the University of Groningen those aspects will be examined in detail.

Sustainability

Sustainability is an essential theme in the current and future development of mobility, logistics and their impact on spatial planning and quality of life in cities and rural areas. The draft of the Dutch climate agreement was presented to the cabinet at the end of 2018. One of the main goals of the draft of the Dutch climate agreement (presented to the cabinet by the end of 2018) is to reach an emission-free and robust mobility system in 2050. Similar goals have been included in the Paris agreement. This innovation agenda aims to contribute to these goals and other sustainability goals (e.g., socio-economic development, social inclusiveness, justice, health, and environmental impacts) by studying the potential of sharing and connectivity in mobility networks and developing smart solutions for bundling of freight flows and connecting public and freight transport networks, data sharing and the introduction of emission free fuels in the maritime and transport sector. The studies will focus both on cities and low-density regions with the intention to make a contribution to increasing quality of life, availability of the system to all users and decreasing congestion by specifically studying the role of policy making and legislation.



Approach

We aim to perform studies in practice together with relevant stakeholders to jointly obtain insights, to collect data and other relevant input, to test and validate outcomes from research and to perform pilots. We intend to incorporate input from stakeholders (companies, non-profit organizations, governmental organizations and citizens) in all phases of the research projects by means of for example valorization panels and round table discussions to incorporate all needs and concerns. By having a responsible innovation approach in each project we will bring together researchers from alpha, beta and gamma perspectives (e.g., philosophy, law, behavioral science, spatial science, logistics, and engineering). Students will be trained, inspired and involved in research and implementation initiatives. The unique location of the University of Groningen creates opportunities for researching developments of mobility in and between two vastly different spatial and infrastructural areas. The north of the Netherlands, including cities as Groningen, Assen, Emmen and Leeuwarden as well as low-density regions including the Wadden provides us with a field lab to test and validate solutions designed.

Participating Faculties

Researchers from the following faculties jointly work on the themes as described in this innovation agenda:

- Faculty of Behavioral and Social Sciences
- Faculty of Economics and Business
- Faculty of Law
- Faculty of Medical Sciences/UMCG
- Faculty of Science and Engineering
- Faculty of Spatial Sciences
- Faculty of Philosophy
- Campus Fryslân
- University College Groningen





Theme 1: Open sharing networks

In open sharing networks for people and freight transport participants can share resources (e.g., vehicles and staff), tasks (e.g., transport requests), space (e.g. infrastructure and warehouses) and responsibilities (e.g., risks and liabilities), depending on business needs and preferences. Think in this respect of a public transport company offering access to its hubs for pick-up and delivery points for e-commerce freight flows. A logistics service provider can make available its unused warehouse space to another company. Or risks can be shared in designing a joint infrastructure for sustainable fuels (e.g., hydrogen).

Aim:
We aim to

- study barriers and opportunities for open sharing networks;
- identify and analyze current and upcoming developments of shared platforms;
- identify and analyze how a changing economy stimulates the public and private sector's usage of shared transportation and infrastructure.

Sub themes:

- Mobility as a shared service
- Physical Internet
- Last mile operations
- Sharing and connecting infrastructure to enable emission free transport

Mobility as a shared service

Accessibility of services is the main goal for mobility of people. In order to develop mobility as a service for public transportation, integral solutions need to be implemented. For example, future development plans of city infrastructure need to optimize the implementation of (shared and connected) multimodality while preventing the further usage of private or unimodal transportation. We research how a changing economy stimulates the public's usage of transportation versus the individual ownership of transportation. In this process, understanding behavior is essential before we can benefit from a shared economy. An incentive to collaborate is needed. This development demands a careful consideration of what we share with one another and who is legally responsible while using shared transportation.

Physical Internet

Smart mobility also deals with the optimization and digitization of logistics and transportation networks. A growing demand for movement of freight requires the connection of logistic systems in hyper-connected open networks to save costs, increase sustainability and customer service. Connecting logistic systems also raises questions of vulnerability, as these systems require the sharing of large amounts of data. Sharing is an important aspect of physical internet networks, but so far hardly studied. Sharing initiatives ask for an integrated approach to logistics, infrastructure and spatial development from a public-private people perspective. New planning and control methods need to be designed to enable full benefits of sharing systems. Next to that a new legal framework needs to be designed for shared liabilities in open sharing networks.

Last mile operations

Last mile operations both concern the final delivery of products to stores or customer homes as well as the movement of public transport passengers from the bus stop or station to their destination. In designing last mile solutions typically one mode of transportation is being studied. Logistics (micro) hubs and hubs for public transportation are being introduced to the mobility system as a way to integrated different modes of transportation and ensure sustainable transport to the final destination. In designing those hubs, it is important to take further development of cities and rural areas into account and what impacts of the environment are expected. Quality of life is an important performance measure in this respect. We aim to study the potential to share hubs for public transport for logistics operations and the benefits of micro hubs in last mile operations. A specific area of application to study is the health care sector where care at home becomes more important.

Sharing infrastructure to enable emission free transport

Both electric and hydrogen vehicles are being introduced to enable emission free transport. Public transport companies already started to use hydrogen-fueled buses. Also electric modes of transportation are being introduced in logistics and mobility networks. An important aspect for all types of new fuels, is the design of sustainable infrastructure to enable full-scale usage. Options for sharing infrastructure is an interesting field of research. How to best facilitate the adoption process needs to be studied. Furthermore, we study how to manage cooperation such that the interests of all stakeholders will be aligned.

Examples of current research projects

Project Name	Short Description	Involved partners	Funding	Period
Towards Virtual Ports in a Physical Internet	The project 'Towards Virtual Ports in a Physical Internet' develops models and tools which can support ports and businesses in their hinterlands to change over to and gradually participate in a complete Physical Internet network.	University of Groningen, Delft University of Technology, Groningen Seaports Port of Rotterdam	NWO	2016-2021
PIONEER	This project focuses on the development of PI-based concepts around micro-hubs for e-commerce, whereby a balance is sought between service orientation, efficiency, sustainability and quality of life.	University of Groningen, Districon, ViaTim, Cycloon/Fietskoeriers.nl, Wehkamp, DHL, Centric, IMCC, Dropper, ZUPR	TKI Dinalog	2019-2022
Fieldlab 'Goederenhub'	Design of robust strategies for deploying freight hubs	University of Groningen, NHL Stenden	Province of Drenthe	2018-2022
Vital Nodes	This project focuses on the integration of the European urban nodes on the TEN-T network corridors focusing on freight and logistics.	Rijkswaterstaat, Trafikverket (SE), Omgeving Vlaanderen (BE), EuroVienna (AU), EGTC Rhine-Alpine, Polis, Eurocities, Ecorys, Rupprecht consult, Uniresearch	EC Horizon 2020	2017-2019





Theme 2: Governance models

To achieve effectively functioning of open and shared smart mobility networks for people and freight transport new governance are needed to enable collaboration and safety and risk management. With governance we refer to government policies, legal and ethical implications and governance and organization of the network itself. Challenges resulting from technological developments, the role of human behavior and organizational changes in information flows (data), flows of people and flows of freight and flows of people and freights need to be studied in this context.

Aim:
We aim to investigate the role of human behavior, ethical and legal boundaries, trust, governance, information and privacy considerations in smart mobility networks.

Sub themes:

- The role of the government
- Stakeholder behavior
- Shared values
- Legal protocols

The role of the government

A complex interplay exists between government, the market and people in smart mobility systems. We study how governments could act to achieve sustainability goals. Specifically, we focus on government-market interaction and government-market-resident interaction. An important question in this respect is what the influence of incentives such as pricing might contribute to a transition towards sustainable smart mobility systems. Insights on financial motivators is input for our studies into stakeholder behavior in smart mobility systems.

Stakeholder behavior

Stakeholders might find switching to smart mobility systems cognitively demanding, and might be inclined to stick to old habits instead of having an increased sense of urgency to make a transition to, for example, sharing. The effect of positive and negative incentives on stakeholder behavior is an important topic of our studies. Next to stakeholder behavior also policy acceptance in smart mobility is studied.

Shared values

In order to implement smart mobility concepts in a sustainable manner, it is of vital importance to realize broadly accepted ethical values such as safety, health or privacy. Furthermore, the process in which such shared values are realized should be reliable and robust. Differences between the interests of diverse parties can make it fragile instead. Shared values and responsibilities play a central role in resolving this challenge. Shared values typically sustain a more consistent perspective on what is important. And, when suitably integrated in the process, they facilitate shared decision-making. Thus, they carry the promise of making the cooperative process more robust such that it promotes value creation.

Legal protocols

Open and fully connected smart mobility networks are enabled by the use of sensors, websites, and apps, which exchange data that include personal information. We investigate how we can develop legal protocols that safeguard the people's privacy and rights and at the same time allow for shared usage, storage and linkage of data by different stakeholders.



Examples of current research projects

Project Name	Short Description	Involved partners	Funding	Period
Designing Innovative and Socially Responsible Heating Systems	Eliminating natural gas use from the built environment and replacing it with sustainable heating systems is vital in reaching our CO2 reduction targets. This program investigates how this can be done in a fair manner.	University of Groningen Delft University of Technology	MVI project	3/2017 – 8/2021
Meaningful Mobility: A novel approach to movement within and between places in later life	Meaningful Mobility aims to develop and employ an integrative approach to explain mobility practices in later life in relation to well-being	University of Groningen together with external partners	ERC	2019-2024
Urban Smart Measures and Incentives for quality of Life Enhancement (U-SMILE)	Congestion, local air quality, parking are challenges that require behavioral change in addition to technological innovation. This project aims to develop, test and evaluate "smart" measures (e.g., innovative mix of negative and positive financial incentives, tradable driving permits and linking real time vehicle identification to virtual market environments) to affect behavior.	University of Groningen, VU Amsterdam, Delft University of Technology, University of Applied Sciences Amsterdam, Amsterdam Arena, De Verkeersondernemin g, Gemeente Amsterdam, Groningen Bereikbaar, Rijkswaterstaat, Zuidas, Zuidasdok	NWO	present
Social Impact Assessment and Managing Urban Transport Infrastructure Projects	Evaluating Social Impact Assessment and Management Practice in Urban Transport-Infrastructure Projects	University of Groningen Macquarie University	University of Groningen Macquarie University	2017-2020
Enhancing the social return from urban transport infrastructure in Asia: a socio-spatial perspective	Studying social returns from urban transport infrastructure	University of Groningen	University of Groningen	2017-2021
SMARTEES	holistic transport policies and designing city blocks	11 partners, refer to this page	EU Horizon 2020	Currently running



Theme 3: Business and organization models

The development and design of new technologies require the protection of information and privacy as mass sharing of data is becoming commonplace for new digital systems. Business models help determine legal and behavioral boundaries and frameworks for innovations of mobility.

Aim:
We aim to develop innovative business and organization models for smart mobility to enable efficient, effective and emission-free transport.

Sub themes:

- Responsibility
- Safety and security
- Competition
- Information connectivity and services

Responsibility

Responsibility is an important aspect to study within the context of smart mobility and specifically how to incorporate it into business models. Examples of questions include for example: who carries responsibility for autonomous vehicles in transport operations? Who carries responsibility for damaged packages in shared delivery processes? How do responsibility issues influence the adoption rate? Into the development of business models related to new technologies and platforms, it is important to consider if current frameworks of law still apply or if new frameworks need to be introduced. New technologies and their related business models also need to be able to adapt to different patterns of behavior in order to guarantee responsible use. The more we rely on technology, the more we need to think about governing the space we have.

Safety and security

Technology moves faster than law: the availability of information and the sharing of data also requires the protection of information. What kind of privacy implications apply to the usage of smart and shared vehicles and their business models? When there is a whole convoy of platooning trucks, do you stop one truck and thus end up stopping the whole convoy? Similar questions hold for the transportation on water and automated shipping routes. The law of the sea is old and might need to be adapted to, for example, enable usage of smart freight vessels. A challenging aspect is the development of an integrated system for availability, protection, and sharing of information to understand the behavior of people with new technology, new systems and their business models.

Competition and collaboration

What kind of policy measures need to be made in order for companies to make optimal choices in their organization and business models? It is crucial for new technologies and systems not to be owned by a single company. Sharing of platforms and logistic collaborations might, however, decrease the development of market competition. New studies need to be performed to analyze in what way organization models need to be design to secure competition in the markets for smart mobility. Furthermore, it needs to be studied what business models fit with (adoption of) sustainable energy behavior in mobility and transport.

Information connectivity and services

Both physical and digital connectivity are key elements of integrated smart mobility systems. Digital connectivity includes the usage of information and communication technologies, data collection and data science. Information needs to be flexible, independent and neutral, based on open protocols, scalable and dynamic. We study the added value for information connectivity and design related service concepts and business models. 5G allows for the transfer of very large amounts of data between any pair of (mobile) locations. Attached services and business models are in the realm of data analytics, by merging, processing and analyzing data and sensor streams.



Examples of current research projects

Project Name	Short Description	Involved partners	Funding	Period
SNN - Region of Smart Factories	The project on "Formation control with guaranteed safety and performance" aims at the development of distributed control algorithms for cooperative systems that can safely deal with obstacles / unsafe region.	University of Groningen, Philips B.V.	SNN	2016-present
Networked Control Systems	In this project, we develop robust distributed control algorithms for multi-agent cyber-physical systems. The aspect of robustness against distributed denial-of-service is also investigated.	University of Groningen, Target B.V.	TTW Perspectief – Robust Design of Cyber Physical Systems	2016-2019
Smart energy systems in the Amsterdam area: Electric vehicle as gateway to smart and sustainable energy use	The fast adoption of electric vehicles in the Amsterdam region will cause capacity problems on the grid. To prevent these problems, people need to adopt various smart and sustainable energy behaviors. Business models need to be developed that support the adoption of various sustainable energy technologies and behavior.	University of Groningen, Eindhoven University of Technology, ABN AMRO, Accenture, E-laad, Engie, The New Motion	NWO	present





Theme 4: Smart solutions

In this theme, adaptivity, connectivity, automation and technology are highlighted as key research aspects of solutions for mobility issues. Innovations of infrastructure and transportation go hand in hand with the organization of spatial development of both the city and of rural areas. Beside adaptivity of technologies, the design of new planning and control algorithms is needed as well as standardization of proven solutions is required. Furthermore, smart solutions include perception and techno-realism of users influencing trust and adaptation of new technologies.

Aim:
We aim to design new smart solutions and technologies to provide effective, resilient and sustainable transportation of people and freight.

Sub themes:

- Adaptive infrastructure
- Technology
- Planning, design and control concepts
- Acceptance and adaptation

Adaptive infrastructure

Spatial connectivity relates to enhancing accessibility, spatial-economic potential, liveability, environmental and spatial quality by careful integrated planning design of infrastructure, mobility and spatial development, involving innovative governance and institutional arrangements. New solutions need to be designed and implemented for adaptive infrastructure. Instead of placing infrastructure for the coming decades, integrative networks of infrastructure need to be developed that can adapt to spatial developments resulting from changes in populations in cities and low-density areas. Furthermore, the goal is to create infrastructure that is widely used while minimizing its inconvenience to other spatial functions such as residential areas and employ potential synergies.

Technology

Technology is essential in maintaining and developing the effectivity and resilience of advanced transportation and logistics systems. Platooning trucks and electrical vehicles are examples of upcoming technologies, which serve as smart and sustainable solutions for mobility issues. Smart cities and autonomous vehicles (for extreme conditions) are examples of future technologies. The control of the dynamics of autonomous agents in traffic control is one of the aspects to consider. One of our ambitions is to further research and develop the automation of delivery and logistics processes. In addition, technologies need to be designed that not just serve as a solution for resources, but also as a solution for information.

Planning, design and control concepts

Participation in smart mobility networks comes with a multitude of new planning, design and control issues for participating companies. For example, how can we balancing supply and demand for transport while sharing resources. Planning of infrastructure and synchronizing connectivity between various modes of transportation is important to realize economical and timely services to customers. We study the design of integrated smart solution tools that address control of day-to-day and real time activities, tactical planning of resources (i.e., fleet size and staff composition) and design of networks (i.e., location of facilities).

Acceptance and adoption

Acceptance and adoption of technology and solutions defines the perception of users of infrastructure and transportation. The phenomenon of adaptation and adaptation can also be described as techno-realism. Although technological innovation can solve a great deal of mobility issues, it is also important that the public trusts and is willing to adapt to new technology. Psychological factors, such as key motivations of people, are good predictors of sustainable behaviors. Important questions are to study how motivational, perceptual and cognitive processes as well as perceived barriers and opportunities affect acceptance and adoption of smart mobility concepts. An example of research is behavioral adaptation of automated driving.



Examples of current research projects

Project Name	Short Description	Involved partners	Funding	Period
SUaaVe: SUpporting acceptance of automated Vehicle	In this project we will test if trustin automated systems can be increased by making the system more human like, which will result the vehicle to be more predictable and usable for passengers and other road users in its surroundings.	University of Groningen and external partners	Horizon 2020	present
The Urban Mobility Observatory	With the Urban Mobility Observatory (UMO) we can provide the required data requirements for smart solutions. UMO links its own databases to existing databases. In this way we realize a complete integration of different types of data, such as data on traffic and mobility behavior and spatial data.	University of Groningen; Delft University of Technology (project leader); VU University Amsterdam; CIT Amsterdam; Eindhoven University of Technology; University of Twente; Utrecht University and Amsterdam Institute for Advanced Metropolitan solutions.	NWO	present
Controlling evolutionary dynamics of networked autonomous agents	It studies how to use incentives to change individuals' preferences in order to steer the collective behavior. It has improving traffic control as one of its aims.	University of Groningen	ERC project	2018-2023
Integrating models and real-time data for zero-defect manufacturing control systems	We develop algorithms that combine model-based control methods and data-driven techniques in dealing with uncertainties in autonomous systems, such as, autonomous vehicles	University of Groningen, Philips, Tata Steel, Photonis, KxA Software Innovations, S[&]T, DevControl, OSISoft	TTW Smart Industry 2016	2017 - present
5G-based indoor localization for autonomous vehicles	In this project, we conduct a pilot study of indoor localization in a warehouse based on 5G wireless information for real-time control of autonomous vehicles	University of Groningen, Arox Logistics	Economic Board Groningen – 5GGroningen	2019-present

Distributed simultaneous localization and mapping (SLAM)	We develop distributed SLAM algorithms for a team of autonomous vehicles. Based on the use of various local sensors (range sensors & cameras)	University of Groningen	Chinese Scholarships Council	2018 – present
Dynamic optimization of container terminal operations	We study and propose algorithms for real-time optimization of berth and quay crane allocation in container terminal operations	University of Groningen	Indonesia Endowment Fund for Education	2012-present
Collaborative Planning of Infrastructure and Spatial Development	This research programme focuses on developing a common framework for interactive planning of infrastructure and spatial development	Rijkswaterstaat, Trafikverket (SE), Vegvesen (NO), Finnish Transport Agency (FI), Asfinag (AU), Highways England (UK), Panteaia, Sweco, Ecorys, Must, AIT, Temah, FFG	CEDR (Conference of European Directors of Roads)	2018-2020
Unburden healthcare with smart logistics	Value of smart logistics for healthcare equipment (e.g., wheelchairs, hospital beds) using real-time data	University of Groningen, Rivas and Vegro	NWO	2019-2023





Educational programs

Students in the following programs follow courses and/or do projects in relation to smart mobility topics.

- Environmental Psychology
- Traffic Psychology
- (Applied) Social Psychology
- Supply Chain Management
- Technology and Operations Management
- IT-recht
- Industrial Engineering and Management
- Mechanical Engineering
- Mathematics
- Computer Science
- Artificial Intelligence
- Environmental and Infrastructure Planning
- Spatial Planning and Design
- Economic Geography
- University College Campus Fryslân

In *learning communities* students, researchers and external partners together learn and work on developing new smart mobility concepts. The aim of learning communities is to facilitate broadening of knowledge and skills and spark the development of new competencies.





Involved researchers

Researcher	Faculty	Department/Institute
Prof. dr. Jos Arts	Spatial Sciences	Urban and Regional Studies Institute
Dr. Farzaneh Bahrami	Spatial Sciences	Urban and Regional Studies Institute
Dr. Ilke Bakir	Economics and Business	Operations
Prof. dr. Dario Bauso	Science & Engineering	Engineering and Technology institute Groningen
Prof. dr. Jeanne Mifsud Bonnici	Law	Security, Technology & e-Privacy
Dr. Thijs Broekhuizen	Economics and Business	Innovation Management & Strategy
Dr. ir. Paul Buijs	Economics and Business	Operations
Prof. dr.ir. Ming Cao	Science & Engineering	Engineering and Technology institute Groningen
Dr. ir. Terry van Dijk	Spatial Sciences	Department of Planning
Dr. ir. Maarten Gijsenberg	Economics and Business	Marketing
Prof. mr. dr. Kars de Graaf	Law	Constitutional, admin. Law & public administration
Prof. dr. Frank Hindriks	Philosophy	Center for Philosophy, Politics and Economics
Dr. Bettina van Hoven	University College Groningen	University College
Dr. Rients Huitema	UMCG	Department of Neurology
Dr. Eelko Huizingh	Economics and Business	Innovation Management & Strategy
Prof. dr. Bayu Jayawardana	Science & Engineering	Engineering and Technology institute Groningen
Dr. Oksana Kavatsyuk	University College Groningen	University College
Mr. dr. Aline Klingenberg	Law	Transboundary Legal Studies
Mr. dr. Rosalie Koolhoven	Law	Transboundary Legal Studies
Dr. Wander Jager	University College Groningen	University College
Prof. dr. David Langley	Economics and Business	Innovation Management & Strategy
Prof. dr. ir. Wim Leendertse	Spatial Sciences	Urban and Regional Studies Institute
Prof. dr. Louise Meijering	Spatial Sciences	Demografie
Dr. Femke Niekerk	Spatial Sciences	Urban and Regional Studies Institute
Dr. Paul Plazier	Spatial Sciences	Urban and Regional Studies Institute
Prof. dr. Kees Jan Roodbergen	Economics and Business	Operations
Prof. dr. ir. Jacquelien Scherpen	Science & Engineering	Engineering and Technology institute Groningen
Prof. dr. Joke Spikman	Medical Sciences/UMCG	Department of Neurology
Prof. dr. Linda Steg	Behavioural and Social Sciences	Environmental Psychology
Dr. Arjan Stuiver	Behavioural and Social Sciences	Environmental Psychology
Prof. dr. ir. Taede Tillema	Spatial Sciences	Urban and Regional Studies Institute
Dr. Evrim Ursavas	Economics and Business	Operations
Dr. Berfu Ünal	Campus Fryslân	Environmental Psychology

	Behavioural and Social Sciences	Campus Fryslân
Dr. Janet Veldstra	Behavioural and Social Sciences	Environmental Psychology
Prof. mr. dr. Albert Verheij	Law	Private Law and Notary Law
Prof. dr. Iris Vis	Economics and Business	Operations
Prof. dr. Dick de Waard	Behavioural and Social Sciences	Environmental Psychology
Dr.ir. Gerd Weitkamp	Spatial Sciences	Center for advanced studies in urban science and design
Dr. Wout van Wezel	Economics and Business	Operations
Prof. dr. Claudia Yamu	Spatial Sciences	Urban and Regional Studies Institute /Center for advanced studies in urban science and design

Any questions, suggestions or feedback on the innovation agenda Smart Mobility of the University of Groningen? Please contact prof. dr. Iris Vis, Dean of Industry Relations or one of the other members of the team of Industry Relations.

E-mail: industryrelations@rug.nl
Phone: 050 363 4508
Address:
Team of Industry Relations
Oude Boteringestraat 44
University of Groningen
9712 GL Groningen

Pictures ©RUG, Peter van der Sijde, Jeroen van Kooten, Jeroen de Lezenne Coulander, Egbert de Boer, Reyer Boxem, Michel de Groot, Pieter Wieringa, Marcel Spanjer

rijksuniversiteit groningen