Working with communities and businesses to design the city of the future
A centre for city simulation

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Cities are entering a new age where new technologies could dramatically change the way people move. New insight is required to understand how we will react to these new mobility options. The University of Leeds is developing a new centre, focused on engaging with the public to co-design and demonstrate new mobility options, and to gather feedback and build interest and user-acceptance.

Virtuocity will be a proving ground and accelerator in which emerging technologies are harnessed to develop innovative solutions to challenges facing cities.

Computational transport modelling has been around since the first general purpose computers were developed over 50 years ago. Early models focused on steady-state conditions. With the evolution of processing power, the models have become more detailed and accurate. Modern agent-based transport models capture each pedestrian and each vehicle and validate with data collected in existing cities.

Virtuocity will use these advanced models along with models of future technology to answer questions like: What should mobility in the city of the future look like? What does technology provide? What will users choose, accept and pay for? What does the resulting city look like? Local authorities wish to design their city to encourage healthy lifestyles, have a vibrant downtown and reasonable transit times. Automotive companies and mobility-as-a-service providers are seeking to
Virtuocity will:

- Work collaboratively with end-users, industry partners and decision makers to answer pressing questions and co-produce new solutions;
- Bring together a commanding set of shared data and models;
- Encourage and support safe, efficient and sustainable mobility.
- Explain and demonstrate new and emerging mobility options
- Focus on the end-users and gather feedback on user acceptance, interest and choices

understand how to design their products to maximise revenues and profits. The only way to answer these questions is with impactful end-user focused co-production and public engagement.

The University has an extensive set of research experience: experiments, data, models and simulations of cities from across the disciplines of social sciences, engineering and medicine. Virtuocity will combine these, so that any researcher can use them in their investigations. Corporate and public partners can also integrate their software, simulations, data and models thereby maximising the research capability of Virtuocity.
Virtuocity will provide partners with a competitive edge through access to a unique combination of facilities, world leading research and key academic experts.

Corporate Partners

Virtuocity will provide corporate partners with a powerful company resource with members able to enjoy varying degrees of access, benefits and involvement dependent on their needs.

As a manufacturer or technology developer, you will have the opportunity to demonstrate and test your latest systems. Virtuocity will engage your end user in technology/system development by collecting critical feedback on preferences, usability, demand and safety.

As a consultancy or software developer, you will have the opportunity to leverage your own capabilities and software with those of Virtuocity. Bring your clients and customers in to experience Virtuocity technology integrated with your own software and assist them in making the right decisions about future cities.

- Use of software, data, models, simulations, virtual reality hardware and simulators.
- Priority access to University researchers, with expertise in a wide variety of fields.
- The opportunity to place a researcher within the Centre.
- Preferential access to reports, papers and research output
- Influence over the Centre’s future research roadmap through a seat on the Advisory Board.
- The opportunity to contribute and formally link to active projects.
- Access to joint research funding via collaborative bids.
- Training opportunities for staff.
Public Partners

As a local, regional, or national Government partner, you will appreciate the opportunity for positive change to be realised from modern mobility technologies. With Virtuocity, you can find out how to encourage your citizens to make healthy choices for mobility, what will make citizens spend more time in the city centres to stimulate vibrant economic centres, and how to reduce traffic jams, congestion, and parking demands. Virtuocity will help you to design cities that are more resilient to floods while reducing air and noise pollution. Citizens and decision-makers will be able to experience and provide feedback on alternative city project designs, before they are built through the use of virtual and augmented reality evaluations from various points of view – ranging from the city planner through service providers to the most vulnerable road users. Designs can be assessed with respect to safety, throughput, efficiency and cost.
VirtuoCity
Combining World-Leading Research at Leeds

**LEEDS INSTITUTE FOR DATA ANALYTICS**
The Leeds Institute for Data Analytics (LIDA) opened in July 2015, and includes £15m of national research council funding for the ESRC Consumer Data Research Centre and the MRC Medical Bioinformatics Centre. Multi-disciplinary teams including mathematicians and computer scientists work alongside researchers from the Faculties of Environment, Business, Medicine and others using data which are shared with a variety of commercial and public sector partners. LIDA occupies 4,000 square metres of high quality accommodation to provide high performance computing (HPC), Powerwall visualisation facilities, safe rooms for sensitive data, and specialist expertise in big data analytics.

**SCHOOL OF PSYCHOLOGY**
The School of Psychology has a set of bespoke virtual reality research facilities. Research focuses on virtual environments that control the visual information available to the driver or bicyclist whilst recording eye-movements and steering behaviours. Projects include the impact of visual factors on HGV safety while interacting with vulnerable road users and the integration of an Oculus Rift and Opto-Trak to perform pedestrian simulation including evaluations of new green space design.

**SCHOOL OF COMPUTING**
The School of Computing is making important contributions to research in the area of data analytics and rapid simulations using distributed servers to analyse Big Data. Our researchers are working on a virtual vehicle design environment for massive-scale simulation integration within the £10M EPSRC/Jaguar Land Rover Programme for Simulation Innovation as well as live data analysis for real-time taxi/private car scheduling and monitoring.

**HIGH PERFORMANCE COMPUTING FACILITIES**
Leeds University Advanced Research Computing (ARC) service provides and supports a large HPC (High Performance Computing or ‘Supercomputing’) facility used by a wide range of research groups and individual researchers across the University. In addition ARC hosts and supports the N8 research consortium’s shared HPC service. In addition to providing this infrastructure, ARC provides a comprehensive training, consultancy and support service focusing on the tools and techniques required to help researchers make the paradigm shift to move from Desktop Computing to High Performance, Cloud and Data Intensive Computing.

**SOCIO-TECHNICAL CENTRE @ LEEDS UNIVERSITY BUSINESS SCHOOL**
The Socio-Technical Centre draws together expertise in organisational psychology and engineering to examine human behaviour in complex socio-technical systems. The Centre is currently undertaking ground breaking research into crowds, their behaviours, and ways in which these behaviours can be simulated. It is also using simulation tools to understand how features of the physical environment can facilitate behaviour change and promote wellbeing, helping planners and designer develop more effective urban solutions.

**NATIONAL FACILITY FOR INNOVATIVE ROBOTIC SYSTEMS**
Our multidisciplinary teams of engineers and scientists are developing novel robotic systems and the underpinning technologies with the aim of improving people’s lives. The facility hosts a £4.2m EPSRC national infrastructure research project with the vision of creating self-repairing cities. Researchers are interested in how cities for the future could be automated to be maintained with robotics whilst used by people.
INSTITUTE FOR TRANSPORT STUDIES
ITS is the largest transport research institute in Europe. Its academics are leaders in transport policy research and economic modelling which, allied with world-leading expertise in micro and macro traffic simulation and consumer choice research, supports a comprehensive understanding of what will deliver the best performing transport systems, policies and solutions. ITS has also developed the most advanced academic research driving simulator in the UK – the next generation of which will be accompanied by a heavy vehicle simulator and a pedestrian and bicycle simulator. This will provide the most integrated set of simulation facilities anywhere for the exploration of human behavioural factors in transport and will be a centrepiece for Virtuocity.

CHOICE MODELLING CENTRE
The Choice Modelling Centre (CMC) is a large cross-disciplinary group of leading academics working in choice modelling across numerous thematic areas, including but not limited to transport, health, energy and business/marketing. Our research covers new methodological developments, theoretical insights and state-of-the-art practical solutions to real world problems. We work both in modelling choices and the development of innovative surveys and techniques for capturing data on choices.

The University of Leeds
World class research drives economic growth and promotes health, quality of life and environmental sustainability, and University of Leeds’ research really is changing the world around us.

From developing innovative health technologies to illuminating the cultural significance of literature and landscapes, the University’s broad research base is vital in fostering innovation, and is considered an essential part of the framework supporting innovation as well as regional and national economic competitiveness.

Already rated amongst the world’s top 100 universities (QS World Rankings 2015), the University’s strategic plan is committed to making a step change in the quality, volume and impact of world-leading research carried out at Leeds, building on existing research strengths and our commitment to interdisciplinary working. The plan commits us to utilising our technology platforms and interdisciplinary research capabilities to address some of the greatest challenges facing our society and the economy.

Our academics are involved in every stage of the research process, from fundamental research at the frontiers of science, to near market-ready applications that are transforming our economy and the wider society in which we live and work.

We have extensive experience of establishing and maintaining long-term research collaborations with major organisations from a range of industries including; Arup, Jaguar Land Rover, Marks & Spencer, Procter & Gamble, AstraZeneca, Unilever, Volvo and Yorkshire Water.
Virtuocity will bring together industry expertise, public sector decision makers and academic excellence in a shared collaborative research centre to design the cities of the future. It will offer:

- A world leading combination of facilities and researchers in a complex, dynamic and multi-disciplinary environment;
- A coordinated and integrated approach to research to provide insight into the future of cities;
- Vast experience in using technology to generate reliable and robust outcomes;
- Interactive research and demonstrations and a proving ground for the co-production of data vital for an evidence based approach to innovation;
- Collaboration opportunities to achieve better, more cost effective mobility solutions.

To find out more about how your organisation can take advantage of a membership please contact:

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