



World leading research with
strong industrial application

One of the largest wireless groups in Europe

Creating a unique 5G Trial Test-Bed for
a Smart City, Region and Campus

Communication Systems & Networks Research Group

at the University of Bristol

About the Group

The Communication Systems & Networks (CSN) Research Group at the University of Bristol is one of the largest in Europe. For more than 30 years the Group has conducted academically renowned and industrially impactful research in wireless communications. Our world leading research addresses topics such as the Internet of Things (IoT), Massive MIMO, Intelligent Transport Systems, dynamic mmWave networks, full duplex communications, wearable healthcare technologies and wireless/fibre network integration. Many of these subjects are critical in the development of efficient and cost-effective 5G and beyond communications. We not only perform fundamental cutting edge research, but via large scale testbeds and trials we translate these concepts into practical prototypes.

Testbeds & Trials

Our focus is on the testing and development of applications and products that will make use of new capabilities of 5G, giving the UK a competitive advantage, driving efficiency, productivity and helping to create a 5G ecosystem. In addition to cutting edge research, the Group is also working on key 5G and beyond technologies and applications that give the UK a competitive advantage and drive forward efficiency and productivity.

In the context of 5G, key technologies include:

- Millimetre Wave
- Small Cells
- Massive MIMO
- Beamforming
- Full Duplex

The Group is developing 5G vertical applications in areas such as transport and smart cities.

🐦 @BristolCSN

Smart Cities

Bristol has recently overtaken London as the leading Smart City in the UK. Our research in IoT and Connected and Autonomous Vehicles (CAV) plays a significant part in the development of a Smart City.

“The successful cities of the future are going to be smart cities. It’s clear that cities across the UK have made considerable progress over the last year, developing and implementing strategies to improve the delivery of public services and the urban environment.”, Sir Andrew Cahn, Huawei UK Board

Connected and Autonomous Vehicles

CSN researchers have led on the development of Vehicle to Anything (V2X) technologies as part of the VENTURER and FLOURISH projects. The Group is conducting research in 5G systems and cellular V2X (C-V2X, LTE-R14), millimetre wave 5G for V2X, ITS-G5, security, privacy & trust for V2X and Mobile Edge Computing. Work is also underway on the development of underpinning theoretical and network simulation tools. CAV will play a significant role in future transportation systems and will unlock enormous societal benefits. Wireless connectivity is one of the underpinning technologies allowed CAVS to transform from autonomous systems to cooperative entities. Not only is the information exchange between all components of the system fundamental to improving road safety and efficiency, but it also paves the way to a wide spectrum of advanced ITS (intelligent transport systems applications) enhancing efficiency, mobility and accessibility.

Smart Internet Lab

Researchers of the CSN Research Group are members of the Smart Internet Lab. This initiative builds on Bristol’s strategic research in communications and digital technologies to create a hub for internet research, with long-lasting benefits for society and the economy.

bristol.ac.uk/smart

Massive MIMO Trials

The CSN Group is working in partnership with the University of Lund (Sweden) and National Instruments (Austin, USA) on the development of a 5G+ Massive MIMO testbed. The platform operates at 3.5GHz using 128 basestation antennas and simultaneously supports up to 24 single antenna clients (or 12 dual antenna clients). This platform currently holds the world record for spectral efficiency, at 145.7 bits/sec/Hz, which translates to an aggregate sum throughput of nearly 3Gbps in a single 20MHz channel.

mmWave Connectivity to Cars

This project, funded by Centre for Connected and Autonomous Vehicles (CCAV), brings together CSN academics and industrialists from Jaguar, Land Rover, BT and BluWireless Technologies to create the knowledge and tools needed to enable high-speed low-latency connectivity to cars. This project considers testing, evaluating and enhancing the performance of 5G communications in a vehicular environment and in particular in a motorway scenario. The project aims to deliver and demonstrate practical bi-directional gigabit per second vehicular links using experimental 5G mmWave New Radio (NR).

5GUK

The 5GUK Testbeds and Trials Programme will deliver a 5G end-to-end trial in early 2018, testing the capability of 5G to make an application or service work in a real-world environment.



5G & Beyond: Technologies, Trials and Testbeds

