



World leading wireless research with
strong industrial application

One of the largest wireless groups in Europe

Creating unique 5G & Beyond
Technologies for Smart Cities

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.

Technologies, Testbeds & Trials

Our focus is on the testing and development of applications and products that will make use of new capabilities, giving the UK a competitive advantage, driving efficiency, productivity and helping to create cutting edge technology. In the context of 5G & Beyond, key technologies include:

- Millimetre Wave for Transport
- Small Cells
- Massive MIMO

- Beamforming
- Full Duplex
- 5G & Beyond
- Flexible Trancievers

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

Facilities

The group is equipped with state-of-the-art wireless facilities, including channel emulators, a 128-antenna real-time massive MIMO testbed. Flexible facilities include the latest Keysight vector signal generator and a Rohde & Swartz signal analyser able to operate at 44GHz with 2GHz of analysis bandwidth, a 4-port Performance Network Analyser up to 50 GHz. The group also has an antenna measurement facility, with a vector network analyser capable of operating up to 60GHz.

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

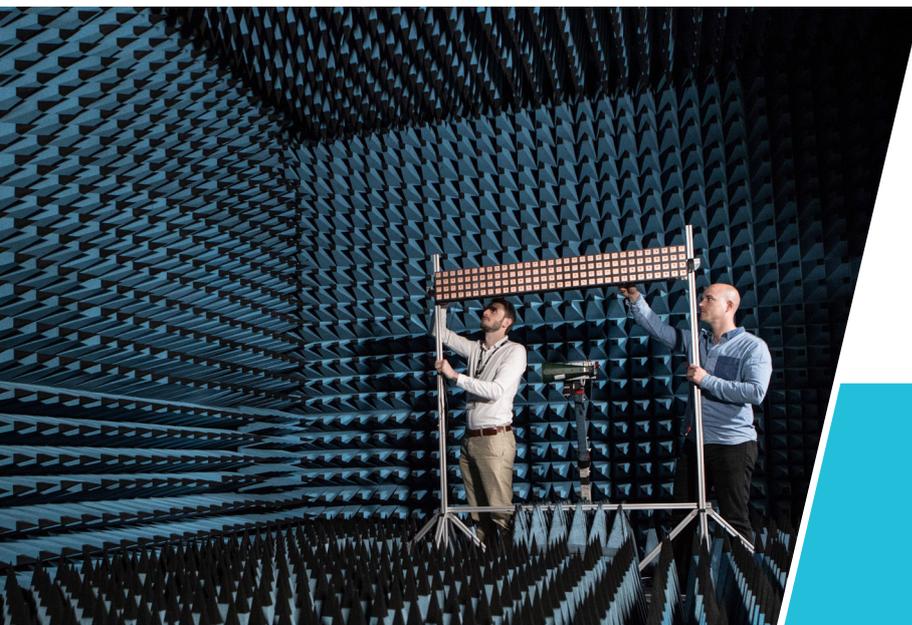
Connected and Autonomous Vehicles

CSN researchers have led on the development of Vehicle to Anything (V2X) technologies with research in cellular V2X (C-V2X, LTE-R14), millimetre wave for V2X, ITS-G5, security, privacy & trust for V2X and Mobile Edge Computing.

Wireless connectivity is one of the underpinning technologies which allow 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.

Secure Wireless Agile Networks (SWAN)

The CSN Group with Toshiba Research Europe Ltd alongside other industry partners Roke Manor Research & GCHQ will focus on the creation of Secure Wireless Agile Networks that are resilient to both cyber-attacks and accidental or induced failures. SWAN aims to create the enabling technology for radios that can truly be software defined and secure by design down to the basic levels of system functionality such as operating frequency bands, modulation, and multiple-access protocols, to make resilient and secure systems.



5G & Beyond:
Communications
Technologies & Trials