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Body-Centric Group

Wireless communications between various devices worn on a human body can be readily used in a number of applications. These include:

- Remote patient monitoring
- Networking equipment worn by military or fire-fighting and rescue personnel
- **Wearable computing (/research/activity/eece/human-computer/human-interface/wearable-comp.aspx)**

Advantages

Replacing wired connections between body-worn devices with wireless links in these applications would greatly improve convenience for the users of such equipment.

Challenges

This convenience comes at a cost of increased power demand and decreased reliability of the link due to propagation fading and possible interference. Besides, wireless link are also prone to eavesdropping and thus bear security risks

Aims

In order to alleviate these problems on-body propagation phenomenon has to be well understood and characterised. Our group has been studying on-body propagation channels for several years.

Past Research Works

- The effects of both the human body and the surrounding environments on several on-body channels have been investigated at a number of frequencies and in many different scenarios
- Empirical models for the propagation channels have been derived
- Advantages of using antenna diversity to mitigate strong fading, and multiple input multiple output (MIMO) systems to increase channel capacity, were investigated and found to be quite significant.

Recently Research Works

- The propagation channels in the millimetre-wave band

This band combines the possibility of very high data rates (sufficient for high-quality video transfer) with an advantage of improved security due to fast attenuation with the distance.

- Efficient high gain antennas for millimetre-wave band

Effcient high gain antennas can be made sufficiently small to be worn on the body. However, the signal at these frequencies is easily blocked by obstacles, which presents a challenge for communication links on a moving person.

Group News

November 2010 : AAEL researchers win the best student paper award in LAPC2010

Loughborough Antenna & Propagation Conference (LAPC) 2010 awarded the best student paper prize to AAEL researchers for the paper "Novel Yagi-Uda antennas for on-body communication at 60 GHz".

People

Academic Staff

- **Prof Peter Hall (/staff/profiles/eece/hall-peter.aspx)** - Head of AAEL laboratory
- **Dr Costas Constantinou (/staff/profiles/eece/constantinou-costas.aspx)** - Head of DSNL laboratory

Research Staff

- Dr Yuriy Nechayev - Characterisation of On-Body Communication Channels (EPSRC)

PhD/MPhil Students

- Mrs Lida Akhoondzadeh-Asl - Wearable Antenna
- Mr Xianyue Wu - Wearable antenna for Gigabit body-centric wireless communications

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