

The Power Electronics, Machines and Control (PEMC) Group is one of largest university centres of its kind worldwide with 16 academics (6 Full Professors, 3 Associate and 7 Assistant Professors) dedicated to the field. The research team also includes ca. 45 Postdoctoral Contract Research Fellows and 64 PhD students. Funding for the Group's research (current portfolio ca. €28M) comes from a diverse range of national/international agencies and industry. The Group coordinates the EPSRC National Centre for Power Electronics, a UK-wide activity supported by an investment of ca. €30M over 7 years including capital equipment and research funding.

Core technology expertise of the Group covers 4 main areas:

- Power Electronic Energy Conversion, Conditioning and Control
- Power Electronics Integration, Packaging, Thermal Management and Reliability
- Motor Drives and Motor Control
- Electrical Machines.

The Group strategy is to sustain an in-house, internationally renowned research capability and portfolio spanning the entire range from power device and component technology to complete power conversion systems. The PEMC Group collaborates closely with complementary groups at Nottingham, and with a number of other Groups in the UK and worldwide. Research activities cover basic technology



The PEMC main research laboratory at University Park Campus.

(e.g. component physical characterisation and technology validation) to applied research (e.g. professionally engineered advanced technology demonstrator hardware for aerospace industries).

The PEMC Group has very strong links with industry, both nationally and internationally, ranging from component suppliers to OEMs, where it applies its core technology expertise to application oriented research. The portfolio of applications is currently orientated towards aerospace, renewable/sustainable energy and future energy networks, but it continually evolves to reflect new opportunities and challenges. Other significant industrial collaborations exist in marine systems, industrial drive systems and power conversion for high power RF sources.

Research in the Group is underpinned by world class experimental and workshop facilities allowing realistic practical validation of novel components and systems.

Work up to 1MVA (continuous) is possible. State-of-the-art specialist facilities exist for power device and packaging research, as well as reliability studies, for in-house prototype electrical machine construction and testing (up to 120,000rpm) and for power converter construction. Dedicated electronic supplies provide emulation of aircraft generation systems up to 270kVA. Extensive modelling capabilities also exist with expertise in most of the established specialist simulation and CAD environments. Reflecting the Group's success, investments from internal and external sources for infrastructure developments and equipment have continued and increased, leading among others to the creation of a dedicated multi-disciplinary Aerospace Research Centre (ARC) and the FlexElec Laboratory, dedicated to research in microgrids and HVDC.

A team of Group members developed the winning 2015 MotoE series race bike!