



NAME: SCHOOL OF MATERIALS,

INSTITUTION: UNIVERSITY OF MANCHESTER

COUNTRY: UNITED KINGDOM

Profile :

The School of Materials is the largest academic Materials focus in Europe, with over 60 academic staff and around 700 students. Comprising the Materials Science Centre, the Corrosion and Protection Centre and Textiles and Paper, the School encompasses an exceptional breadth of research and training in materials, from design and development, to performance and protection and management and marketing.

In the last two research assessment exercises, a key indicator of international research quality and impact, the Materials Science Centre and Corrosion and Protection Centre were awarded the top 5* rating. The current annual research income of the School exceeds £7M and is derived from diverse sources, including the Research Councils, government and, industry, and this financial platform supports more than 150 research students and 60 postdoctoral research assistants drawn from all parts of the world, creating a unique research facility and environment. By effectively integrating the School's research infrastructure, collaborative and multidisciplinary projects have been established across the School, the University and with industry. Based on the high quality research, a number of specialist School research centres have been established, providing a focus on specific research areas involving nuclear science and engineering, metal/polymer and composite characterisation, aerospace technology and innovative textile materials. These centres underline the wider research activities within the School, which is organised into ten research areas, but many interdisciplinary projects straddle research groups, other schools and other universities.

Activities:

- Education in the field of Material Science, Corrosion and Protection, and Textile Science, Design and Management. The School offers 8 undergraduate BSc programmes and 4 MEng programmes, and 5 postgraduate MSc taught programmes.
- Research in the all three fields on leading to MPhil and doctoral degrees. The School enjoys the top class reputation in its research activities in Material Science, Corrosion and Protection as well as in Textile Science. The applications of the research in the School include nuclear science and engineering, aerospace, and other hi-tech areas.
- Services to and collaborations with the industry. The School houses the top class testing and research equipments for all its activities which are accessible to the industry, and carries out work with the industry on different levels from collaborative research to knowledge transfer.

Expertise on following materials:

- Biomaterial
- Ceramics and Glasses

- Composite Materials
- Corrosion and Protection
- Metallic Materials
- Nanostructured Materials
- Paper Science
- Polymer Science and Engineering
- Stress and Damage Characterisation
- Textile Design, Fashion and Management
- Textile Science and Technology

Actual research domains concerning materials technology / Competences :

- Biomaterials:
 - Self assembled gels
 - Nanofibrous materials
 - Bioactive glasses
 - Polymer hydrogels
 - Glycobiology
 - Enzyme Responsive Materials
 - Ink Jet Printing
 - Electrospinning
 - Stem Cell Biology
- Ceramics and Glasses:
 - Electroceramics
 - Advanced Processing Techniques and Mechanical Properties
 - Ceramic Coatings
 - Advanced Characterisation Techniques
 - Nuclear Graphite
- Composite Materials:
 - Performance, Modelling, Impact and Durability
 - Fibres, Textile Structures, Textile Design, Lay-up
 - Thermoplastics, Thermosets, Matrix/Fibre Chemistry
 - Unidirectional MMCs/GLARE, Short Fibre Cast MMCs
 - Damage Characterisation
- Corrosion and Protection:
 - Corrosion Mechanisms, Prediction and Control
 - Environmental Degradation and Protection by Coatings
 - High temperature Protection
 - Performance of Light Alloys
- Metallic Materials:
 - Airframe, Aero-engine, and Transport Materials
 - Forming: superplasticity, severe deformation and ultrafine grained materials
 - Joining and Friction Welding
 - Materials for Chemical, Process and Power Generation Industries
 - Phase Equilibria and Transformations
 - Stress, Damage and Failure Mechanisms
 - Surface Treatment and Corrosion Protection

Thermomechanical Processing

- Nanostructured Materials:
 - Deformation micromechanics of carbon nanotubes and their composites using Raman spectroscopy
 - Nanoporous substrates for tissue engineering
 - Nanostructured surfaces for improved environmental resistance
 - Electrospinning of nanofibres
 - Nanoengineering using lasers
 - Polymer nanocomposites
 - High-resolution electron microscopy and spectroscopy studies of oxide surfaces, nanotubes, nano-diamond, metallic and semiconductor nano-particles
 - Synthesis of ceramic nanoparticles and fabrication of nanostructured ceramic coatings
- Paper Science:
 - Structure of stochastic fibrous materials
 - Orthotropic shrinkage of paper during drying
 - Flow in saturated compressible porous materials
 - Surface and colloid chemistry
 - Friction of paper surfaces
- Polymer Science and Engineering:
 - Biopolymers
 - Coatings and Films
 - Composites
 - Deformation Micromechanics
 - Fibres
 - Multiphase Polymers
 - Polymer Colloids
 - Polymerisation
 - Polymer Processing
 - Responsive Polymers
- Stress and Damage Characterisation:
 - Atomic force microscopy
 - C Scan analysis
 - 3D Coordinate measuring
 - Electron speckle pattern interferometry
 - Image correlation
 - Laboratory X-ray diffraction
 - Magnetic methods for stress measurement
 - Nanoindentation
 - Neutron strain measurement
 - Raman spectroscopy
 - Scanning acoustic microscopy
 - Residual stress measurement using the slitting method
 - X ray tomography
- Textile Design, Fashion and Management:
 - Design communication



European Network of Materials Research Centres

<ul style="list-style-type: none">Design educationDesign managementDigital designEmotional aspects of design and consumer behaviourFashion designFashion retailingGlobal operations managementInternational supply chain managementTextile design- Textile Science and Technology:<ul style="list-style-type: none">Textile Composites3D StructuresMedical TextilesFibre and Fabric Mechanics and InteractionsHair AnalysisClothing Engineering/Comfort and MicroclimatesBallistics and Personal ProtectionSustainable Textile MaterialsDesign and synthesis of novel, high performance colourantsColouration processing and assessment standardisationDye/Fibre interactions during launderingEffect chemicals for fibre and fabric performance enhancementColour perception and analysis – human and instrumentalArtificial intelligence and image analysisDigital conservation and presentation of cultural heritageHair chemistry and analysisSurface chemistry of textiles and paper
<p>Available research infrastructure : The School of Materials at the University of Manchester possesses up-to-date infrastructure supporting all research areas that can be accessible to all ENMat members. Enquiries on the research infrastructure are welcome through the representative of the School of Materials.</p>
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