

Darran Robert Cairns

Personal Details

Work

Tailored Surfaces,
Morgantown, WV, 26505
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Cell: 304 216-9363

Home

1608 SE 2nd Terrace,
Lee's Summit, MO, 64063

Education

1999 **PhD Materials Science**

University of Birmingham, Edgbaston, Birmingham, United Kingdom

1995 **BSc Physics**

University of Birmingham, Edgbaston, Birmingham, United Kingdom

Research Experience

2014-Present **CEO and Founder**

Tailored Surfaces, Morgantown, WV, USA

- Solution based processing of smart materials.
- Micro and nano-composite materials.
- Liquid crystalline materials and composites.
- Flexible Laminate Electronics.
- Sensors and Touch Screens.
- Display Materials and Optical Components.

2006-Present **Associate Professor in Mechanical Engineering
(Adjunct Associate Professor since August 2014)**

West Virginia University, Mechanical & Aerospace, Morgantown, WV, USA

- Solution based processing of composite materials.
- Micro and nano-composite materials.
- Liquid crystalline materials and composites.
- Flexible Laminate Electronics.
- Sensors and Touch Screens
- Display and Lighting Materials.

2001-2005 **Research Specialist**

3M Touch Systems, Optical Systems Division, Methuen, MA, USA

- Touch Sensors
- High performance coatings for mechanical protection of displays and touch sensors
- Metallization of organic and inorganic transparent conducting films
- Development of wear resistant composite sol-gel optical coatings
- Degradation mechanisms of functional materials
- Processing-structure-properties relations of transparent conducting films
- High performance Pb-free nanoparticle based thick film ceramics.
- Micro-composite based adhesive systems for solder replacement.

1998-2001 **Postdoctoral Research Associate in Engineering**

Brown University, Division of Engineering, Providence, RI, USA

- Opto-mechanical properties of organic functional materials
- Electrical and mechanical properties of functional transparent conducting materials on polymers for flexible device applications
- Fabrication and characterization of organic passive optical components for information displays

- Self-assembled electro-optical meso-structures from reactive liquid crystal monomers
- Fabrication and characterization of strain sensors from liquid crystal-polymer composites
- Flexible and conformable information displays
- Physical aging of liquid crystalline materials

1995-1998 **Graduate Student in Metallurgy & Materials**
University of Birmingham, Edgbaston, Birmingham, UK

- Dissertation title "The mechanical reliability of silica optical fibres"
- Experimental and statistical analysis of mechanical failure of optical fibres in aqueous environments. Sponsored by Pirelli Cables UK Ltd.

Teaching Experience

1999-2005 **Adjunct Assistant Professor in Engineering**
Brown University, Division of Engineering, Providence, RI, USA

- Course title: Structure and Properties of Non-Metallic Materials
- Full responsibility for course development
- Upper level class primarily Seniors and Graduate Students

2000 **Adjunct Assistant Professor in Physics**
University of Massachusetts, Department of Physics, Dartmouth, MA, USA

- Course title: 2nd Semester Physics (Electric Circuits and Electromagnetism) for modern physics program
- Studio based teaching approach with all teaching performed in the laboratory

1995-1998 **Teaching Assistant in Mathematics and Engineering**
University of Birmingham, Edgbaston, Birmingham, UK

- TA for Department of Mathematics engineering mathematics courses
- Laboratory demonstrator for numerical and computational methods course including development of laboratory assignments
- Laboratory demonstrator for polymer processing laboratory
- TA for composite beam design experiment

Prior Consultancies

Apple Inc. and Anor. v. Samsung Electronics Co. Ltd. and Anor. NSD 1243 of 2011 (Federal Court of Australia, New South Wales, Australia).
Retained as independent expert witness by Freehills acting on behalf of Apple Inc. and Anor. to provide independent expert advice on touch-screen technology. Prepared expert reports and gave oral testimony at trial.

Apple Inc. v. Samsung Electronics Co., 5:11-CV-01846-LHK, U.S. District Court, Northern District of California (San Jose).
Retained as an expert consultant by Bridges Mavrakakis LLP acting on behalf of Apple Inc. to provide expert advice on touch-screen technology.

Apple Inc. v. HTC Corp., ITC Inv. No. 337-TA-797 US International Trade Commission (Washington DC). Retained as an expert consultant by Feinberg Day Alberti & Thompson LLP acting on behalf of Apple Inc. to provide expert advice on touch-screen technology. Prepared expert reports, provided deposition testimony and oral testimony at trial.

Intellectual Ventures I LLC. and Intellectual Ventures II LLC v. Motorola Mobility inc., 1:11-cv-00908-UNA, U.S. District Court, Delaware. Retained as an expert consultant by Feinberg Day Alberti & Thompson LLP acting on behalf of Intellectual Ventures I LLC and Intellectual Ventures II LLC to provide expert advice on portable displays. Prepared expert reports and deposition testimony.

TPK Touch Solutions Inc. v. Wintek Electro-Optics Corporation., 3:2013-cv-02218, U.S. District Court, California Northern District. Retained as an expert consultant by White and Case LLP acting on behalf of TPK Touch Solutions Inc. to provide expert advice on touch sensors and touch sensor fabrication.

Tallahassee Communications Industries, Inc. v. Avnet Inc., DC-11-04062, U.S. District Court, Dallas. Retained as an expert consultant by Gardere Wynne Sewell LLP acting on behalf of Avnet Inc. to provide expert advice on touch sensors.

Fiteq Inc. v. Venture Corporation et al., 5:13-cv-01946, U.S. District Court, California Northern District. Retained as an expert consultant by Snell and Wilmer LLP acting on behalf of Venture Corporation et al. to provide expert advice on the fabrication of powered flexible smart cards.

Sources of Grant Funding in Areas of Expertise

National Science Foundation, NASA, West Virginia Higher Education Policy Commission, Solutia, Grote Industries, EuropTec USA, West Virginia University, Kopp Glass.

Supervisory Experience

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| 2002-2003 | Research Engineer Aaron Kessman, 3M Touch Systems (Supervisor) Fabrication and characterization of thin film touch sensors |
| 2005 | Technicians Mauricio Lopez, 3M Touch Systems (Supervisor) Pb free nanocomposite thick films |
| 2005 | Scott Driscoll, 3M Touch Systems (Supervisor) Mechanical properties of Pb free electrical interconnects |
| | 3M Summer Undergraduate Research Program |
| 2005 | Lisa Jog, MSE, Brown University (Supervisor) Pb free nanocomposite thick films |
| 2004 | Jason Rich, ChemE, Cornell University (Supervisor) Processing/mechanical property relationships for sol-gel derived silica nanocomposites |
| 2008-2012 | Research Assistant Professors Supervised Dr. Kostas Sierros Polymer materials for energy utilization |

PostDoctoral Scholars Supervised

- 2006-2008 Dr. Karpagavalli Ramji
Corrosion resistance of ceramic films
- 2007-2008 Dr. Kostas Sierros
Polymer materials for energy utilization

PhD Students

- 2010 (Award) Brice Gnahore, AE, West Virginia University, Mechanical Properties of Aerogels
- 2011 (Award) Aaron Kessman, ME, West Virginia University, Mesostructured sol-gel coatings
NSF Fellowship and NDSEG Fellowship
- 2009-Present Teddi Bejital, ME, West Virginia University, Degradation of Flexible Conductors
- 2009-2012 Nicholas Morris, ME, West Virginia University, Dynamic Roughness Films
NSF Fellowship
- 2011-Present Derrick Banerjee, ME, West Virginia University
Nanoindentation of Oleophobic Films
Ruby Fellowship

MS Students

- 2008 (Award) Matthew Shafran, ME, West Virginia University
Stimulus responsive polymer nanostructures
- 2010 (Award) Rignesh Desai, ME, West Virginia University
TiO₂ coatings for biomedical applications
- 2010 (Award) Sarah Smith, AE, West Virginia University
Responsive polymer surfaces for aerodynamic flow control
- 2007-Present Darren Huckaby, ME, West Virginia University
Oleophobic sol-gel coatings
- 2012 (Award) Elizabeth DeFusco, ME, West Virginia University
Tribological coatings
- 2011-Present Edward Chambers, ME, West Virginia University
Surface and Interfaces in Flexible LED laminates
NSF Fellowship
- 2011-2012 Sean Cronin, ME, West Virginia University
Corrosion of Solar Reflectors
- 2012-Present Andrew Hoover, ME, West Virginia University

Tribology of Zip-Lines and Cables

Undergraduate Students

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| 2010-2011 | Andrew Hoover, ME, West Virginia University Mechanical behaviour of flexible conductors |
| 2008-2010 | Derick Banerjee, ME, West Virginia University Nanoindentation of ITO Films |
| 2008-2011 | Sean Cronin, MAE, West Virginia University Corrosion of Solar Reflectors |
| 2008-2010 | Sarah Zimmerman, ME, West Virginia University Tribology of Functional Films |
| 2008-2010 | Corey Snyder, MAE, West Virginia University Wear of ITO Films |
| 2008-2010 | Ondra Karas, AE, West Virginia University Flexible Solid State Lighting |
| 2007-2009 | Nick Morris, ME, West Virginia University Stress-corrosion of ITO films |
| 2006-2009 | Phil Evans, MAE, West Virginia University Speckle of anti-glare surfaces |
| 2007-2008 | Ryan Nutter, MAE, West Virginia University Spray coating of sol-gel films |
| 2006-2007 | John Brewer, ME, West Virginia University Aging of alkoxide sols |
| 2006-2007 | Nick Hansford, AE, West Virginia University Aggregation of nanoparticles |
| 2002-2003 | Suraj Gorkhali, EE, Brown University (thesis reader) Flexible and conformable displays |
| 2000 | Lara Oliver, EE, Brown University (day-to-day supervision) Flexible Display Materials |
| 2000 | Vicki Shier, EE, Brown University (day-to-day supervision) Flexible Displays Materials |
| 1999 | Suzanne Sachsman, EE, Brown University (day-to-day supervision) Flexible Display Materials |
| 1999 | Richard Witte, MSE, UIUC (day-to-day supervision) Flexible Displays Materials |
| 1999 | Dan Sparacin, MSE, Brown University (day-to-day supervision) |

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