

Prof. Peter Bryanston-Cross. BSc.PhD.CEng.
School of Engineering
Warwick University

Professor (Emeritus) Peter Bryanston-Cross (2014-)
Visiting Professor Changchun University 2015-
Optical Consultant Osney Lab Oxford 2010-2016
Optical Consultant Culham (laser fusion) Lab Oxford 1996-2018
Professor Warwick University 1985-2013
Visiting Full Professor Massachusetts Institute of technology
Aeronautics & Astronautics 1990-2018
Senior Research Fellow Churchill College Cambridge 1980-1985
Senior Research Officer Rolls-Royce 1977-1980

Prior Experience

BSc four year sandwich course in Applied Physics.
The University of Aston in Birmingham 1970-1974

Ph.D. Applied Physics: The University of Aston in Birmingham, 1974-1977.
Supported by Rover Cars Limited. The period was spent studying the heat transfer characteristics, , material construction, boundary layer theory and production methods of automotive radiators. The measurements were made using heat transfer gauges and holography. A costing plan was also created for the manufacture of car radiators.

Sept 1977- Dec 1980 Research officer Rolls Royce Derby
Research projects were performed in conjunction with Oxford (Osney labs) & Cambridge (Whittle labs) The construction of a mobile holographic camera for visualising the three dimensional transonic flow within a gas turbine engine

Jan 1981- Sept 1985 Senior Research Fellow Churchill College Cambridge
The Central Electricity Generating Board (CEGB) research fellowship was a period spent developing optical diagnostics for turbomachinery at the Whittle Lab . During this period a pulsed laser optical system was constructed for the Aeronautics Laboratory of the Engineering Department.

Supervised 30+ PhDs

Skills and expertise

Applied Optics: Interferometry, Digital Holography, Diffraction, Laser technology and construction, Optical metrology, Fourier transform Optics Coherence' nuclear fusion temperature measurement diagnostics.

Experimental Fluid Mechanics Particle Image Velocimetry, Turbulence, Aerodynamics Wind Tunnel Modelling, Large scale Turbomachinery testing, Thermal Engineering, Carbon Dioxide measurement Combustion Analysis

Biomedical Engineering: Human Eye diagnostics, Biomimicking of respiratory systems, Digital microscopic measurement of cell and nucleus using digital holography.

Publications 2014-19

- Instantaneous impact measurements of an anodised aluminium surface using a Birefringent phase sensitive high speed camera
PJ Bryanston-Cross, J Nawsasra - Fringe 2013, Published 2014 - Springer
- Spray development process of aviation fuel using a low-pressure fuel injector: Visualisation and analysis.
R Zakaria, P Bryanston-Cross... -Journal of Mechanical ..., 2014 - Springer
- Human perception of visual stimuli modulated by direction of linear polarization
Gary P Misson · Peter J Bryanston-Cross
Vision research 08/2015; 115(Pt A). DOI:10.1016/j.visres.2015.08.004
- Long range visualisation of 300nm diameter particles as a diagnostic for high speed combustion flows.
PJ Bryanston-Cross, BH Timmerman 2015 - ieeexplore.ieee.org
- Sub-Wavefront Birefringent Phase Measurement of Anodized Aluminum Surface Coatings
P.Bryantson-Cross IEEE Nano-technology conference Changqing 19-23/07/2016
- Apparatus and method for inducing polarization perception in an observer
PJ Bryanston-Cross, GP Misson... - US Patent App. 15 ..., 2016 - Google Patents
- R Zakaria, P Bryanston-Cross Digital image processing techniques for the analysis of fuel sprays global pattern
IOP Conference Series: Materials Science and Engineering, Volume 282,
- Experimental Assessment of Thermodynamic Properties for Metastable CO₂ S
Spakovszky, Claudio Lettieri; Derek Paxson, Peter Bryanston-Cross P Bryaston-Cross - The Fifth International. The 5th International Symposium - Supercritical CO₂ Power Cycles March 28-31, 2016, San Antonio, Texas, 2016
- Nozzle Claudio Lettieri; Derek Paxson; Zoltan Spakovszky; Peter Bryanston-Cross Characterization of Nonequilibrium Condensation of Supercritical Carbon Dioxide in a de Laval J. *Eng. Gas Turbines Power*. 2017; 140(4):041701-041701-11. GTP-17-1395 doi: 10.1115/1.4038082
Awarded ASME Best paper of 2017
- P. J. Bryanston-Cross; The portable 'hand held' digital ophthalmoscope: a new type of high resolution hand held retinal imaging instrument[C], Proceedings Volume 10685, Biophotonics: Photonic Solutions for Better Health Care VI; 1068520 (2018) [doi: 10.1117/12.2306634]
- Yahong Li, Yuegang Fu, Zhiying Liu, Jianhong Zhou, P. J. Bryanston-Cross, Yan Li, and Wenjun He, Three-dimensional polarization algebra for all polarization sensitive optical systems.[J] *Optics Express*, 11(26):14109-14122(2018). [doi: 10.1364/OE.26.014109]

Publications 2019-2023

- Spatial frequency sensitivity analysis of polarized light perception on the human macular with 3D Stokes vector Q Wang, PJ Bryanston-Cross,- *Optics & Laser* ..., 2020 – Elsevier
- Simulation and application of a 3D Stokes model to the human polarized light perception optical phenomena Q Wang, PJ Bryanston-Cross... - AOPC 2020: Optical ..., 2020 - spiedigitallibrary.org

- Mathematical modelling and experimental verification of aging human eyes polarization sensitivity Q Wang, PJ Bryanston-Cross, Y Li, Z Liu - JOSA A, 2022 - opg.optica.org
- Fabrication of periodic hierarchical structures with anti-icing performance by direct laser interference lithography and hydrothermal treatment. Dongdong Liu, Ri Liu, Liang Cao, Sadaf Saeed, Peter John Bryanston-Cross, Zuobin Wang, Surface and Coatings Technology, Volume 471, 2023, 129819, ISSN 0257-8972, Elsevier <https://doi.org/10.1016/j.surfcoat.2023.129819>
- Spatial frequency sensitivity analysis of polarized light perception on the human macular with 3D Stokes vector Q Wang, PJ Bryanston-Cross, ... - Optics & Laser ..., 2020 – Elsevier
- Fabrication of Flower-like Superhydrophobic Surface by Hydrothermal Treatment for Anti-icing. D. Liu, R. Liu, S. Saeed, Z. Wang, L. Dong and P. Bryanston-Cross, 2022 IEEE International Conference on Manipulation, Manufacturing and Measurement on the Nanoscale (3M-NANO), Tianjin, China, 2022, pp. 443-446, doi: 10.1109/3M-NANO56083.2022.9941660.
- Three-dimensional polarization tracking model of interactions between light and scattering media. Yu Zhao, Yahong Li, Jinkui Chu, Xiangwei Zeng, Guan Chuanlong, Yuegang Fu, and Peter J. Bryanston-cross Eleventh ..., 2019 - spiedigitallibrary.org
- Imaging Cancer Cells Using a Holographic Microscope. Y Zhao, P Bryanston-Cross Zhao, Yikun and Bryanston-Cross, Peter. IEEE International Conference on Manipulation, Manufacturing and Measurement on the Nanoscale (3M-NANO), Tianjin, China, 08-12 Aug 2022. Published: 2022 IEEE International Conference on Manipulation, Manufacturing and Measurement on the Nanoscale (3M-NANO) pp. 385-390. ISBN 9781665475440. doi:10.1109/3m-nano56083.2022.9941675 ISSN 2373-5422.
- Geometric Visualization of the 3D Polarimetric Information of an Arbitrary Electromagnetic Field Y Li, B Li, W Wei. , X Zeng, Y Fu, Y Zhao. Photonics 2023, 10(9), 1040; <https://doi.org/10.3390/photonics10091040>
Received: 27 June 2023 / Revised: 3 September 2023 / Accepted: 5 September 2023 / Published: 12 September 2023. The authors would like to thank Peter J. Bryanston–Cross from the school of Engineering Warwick University.

Publications 2023-

- Fabrication of periodic hierarchical structures with anti-icing performance by direct laser interference lithography and hydrothermal treatment
R Liu, L Cao, S Saeed, PJ Bryanston-Cross... - Surface and Coatings ..., 2023 - Elsevier
The height and cross-sectional area of cylindrical cuvettes were 2.0 cm and 1.0 cm², respectively. The cooling stage was cooled at -10.0 ± 0.5 °C to completely freeze the water in ...
- Mathematical modelling and experimental verification of aging human eyes polarization sensitivity
Q Wang, PJ Bryanston-Cross, Y Li, Z Liu - JOSA A, 2022 - opg.optica.org

The polarization perception sensitivity of the human eyes affects the perceived polarized image quality. In this paper, we used polarized spatiotemporal structured images to develop a ...

- Mathematical and experimental description of spatiotemporal frequency sensitivity for human polarization perception
Q Wang, PJ Bryanston-Cross, Y Li, Z Liu - Optik, 2022 - Elsevier
The sensitivity of the human eye affects the quality of images perceived by it. This paper presents an approach to optimize the polarized image stimulus. We investigated the macular ...
- Three-dimensional polarization ray-tracing Mueller algorithm for an optical system with arbitrary surface type.
X Zeng, Y Fu, PJ Bryanston-Cross - ... on Information Optics ..., 2023 - spiedigitallibrary.org
In order to investigate the relationship between the interface parameters of an optical interface/system and its polarization characteristics, a three-dimensional (3D) polarization ray-...
- Phase Imaging of Human Cells Using Digital Holographic Microscopy
P Bryanston-Cross, Y Zhao, T Judge... - ... Measurement on the ..., 2024 - ieeexplore.ieee.org
Digital holographic microscopy (DHM) is a 3D method for imaging cells without using labels. It gives detailed information about cell shape and behaviour. This study has explored two ...
- Optical Super-resolution Diagnostics: A Review of Sub-wavelength Measurements and Applications
P Bryanston-Cross, T Judge... - 2023 IEEE International ..., 2023 - ieeexplore.ieee.org
Optical super-resolution diagnostics have revolutionised the field of imaging by visualising structures beyond the previously established diffraction and information resolution limits.
- A Nanoparticle-Based Artificial Ear for Personalized Classification of Emotions in the Human Voice Using Deep Learning. D Liu, Y Zhao, Y Tian, P **Bryanston-Cross**... - ... Applied Materials & ..., 2024 - ACS Publications
- Nanosecond laser interference ablation of fluorine-free aluminum alloy surfaces for dynamic adhesion and static wettability synergistically modulating water collection. D Liu, R Liu, L Cao, P **Bryanston-Cross**, Z Zhang... - Colloids and Surfaces A ..., 2025 – Elsevier
Water collection from mist is a potential solution to water scarcity, which is a critical issue worldwide. In this paper, laser interference ablation assisted with stearic acid immersion has ...