

Faculty of Engineering

MyWorld UKRI Strength in Places Programme PhD Scholarships 2022

Faculty / School or Division: School of Computer Science, Electrical and Electronic Engineering, and Engineering Mathematics (SCEEM)

Faculty/School or Division Address: Merchant Venturers Building, Woodland Road, Bristol BS8 1UB

Job Family:	Research		
Grade/Pathway:	PhD Scholarship	Stipend:	A basic stipend £15,609 per annum (2022 rates) with possibility of top up by up to £3,000pa.
Work pattern:	Full-time	Contract type:	Funding for 3 or 4 years depending on award
Fees:	Fees for home and EU students are covered. In some cases international students may be eligible.	Vacancy Reference:	MyWorld_PhD_scholarships_2022

Further Particulars

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1. Introduction

Bristol is a globally leading centre for the creative industries and the University of Bristol provides strategic and research leadership across this local cluster. Led by the University of Bristol, the newly established MyWorld research programme builds on this leadership fusing contributions from the region's universities with the creative production and technology strengths of businesses across the world. Its aim is to catalyse innovation driven growth, by enabling collaborations and synergies across the technology and creativity landscape.

The MyWorld Creative Technologies Hub is now recruiting staff to support its mission to further grow the West of England as a globally leading Creative Industries Cluster. MyWorld is a £46m R&D programme, awarded to the University of Bristol, under the leadership of Professor David Bull, with £30m from the UKRI Strength in Places Fund (SIPF) and a further £16m committed from an alliance of more than 30 industry and academic organisations. SIPF is a UK Research and Innovation (UKRI) flagship competitive funding scheme that takes a place-based approach to research and innovation funding with the aim of creating significant local economic growth. It is a major intervention by UK Government to explore the potential of devolved R&D funding.

MyWorld is a five-year R&D programme which started in 2021. It is a flagship for the UK's creative technology sector and unique worldwide. To help us build the team, the University of Bristol is currently making major investments to recruit new posts at Professorial, Lecturer, Technician, Researcher (Post-Doctoral and PhD), technical and administrative grades.

This document describes a number of opportunities for outstanding candidates to join the MyWorld team as PhD students. Opportunities for innovation and investigation exist across the MyWorld portfolio, including content acquisition and post-production, content delivery and interactivity, and audience understanding.

2. Role Description

2.1 Post Specific Details and Statement of Responsibilities

All posts will cover student stipend at a basic rate of £15,609 per annum (2022 rates) with possibility of enhancement by up to £3,000 in some cases. Fees for home (UK-based) students are covered in all cases. Several awards cover fees for EU students and some cover overseas students.

Appointees will be expected to integrate within the MyWorld team, to conduct internationally-leading research, and to contribute to the wider objectives and activities of the programme. Many of the awards will involve collaboration with our industry partners and would offer the potential of career development through internships as part of the PhD.

Research Focus: The Visual Information Laboratory in Bristol Vision Institute (BVI) and the MyWorld Programme combine to make the University of Bristol a powerhouse for the development of visual media communications. The work of these groups in this area has been supported by world-leading organisations such as Netflix, BBC, BT, NTT and YouTube. The research focus of these PhD studentships will be linked to the strategic objectives of MyWorld, promoting new technology research that underpins the delivery of future experiences and services. Applications are invited in the following areas:

- **Content Acquisition and Post-Production (up to 3 posts):** AI methods in post-production – video denoising, colourisation and enhancement; low light fusion and autofocus (**BBC iCASE sponsored**); virtual production technologies; intelligent and automated cinematographies (including drone cinematography); camera tracking and SLAM methods in virtual production;

Building interactive worlds – enabling the metaverse; creating re-useable assets for virtual production.

- **Content Delivery and Interactivity (up to 3 posts):** perceptually optimised video compression; dynamic optimisation of streamed video; energy-efficient video coding; new architectures and tools for emerging AoM standards (**Netflix sponsored**); machine learning methods for video delivery; perceptual video quality metrics; transcoding methods for user generated content; volumetric video coding (**BT iCASE sponsored**); coding beyond compression, media network optimisation.
- **Audience Understanding (2 posts):** Methods for assessing quality of experience and immersion; biometrics, and fusion of these, for audience understanding; motion magnification for user engagement; creation and exploitation of visual field maps.
- **Experimental Productions (1 post):** Enabling the metaverse; building environments for virtual rehearsal; building and evaluating immersive natural history experiences.

Teaching Opportunities: The appointees will have opportunities to gain career experience undertaking some project supervision at UG and MSc levels linked to the MyWorld programme, and also to contribute to the development and delivery of short courses related to the programme. Opportunities to engage in paid Teaching Assistant roles also exist.

Administration Responsibilities: The appointee will be expected to contribute to reporting of progress, publication, presentation, and will have opportunities to contribute to the organisation and delivery of MyWorld engagement activities.

2.2 Contacts

Supervisory Team: Professor David Bull (Director, MyWorld), Dr. Aaron Zhang (Lecturer in Visual Communications); Dr Pui Anantrasirichai (Senior Lecturer in Creative Media Technologies); Professor Andrew Calway (Professor of Computer Vision), Professor Kirsten Cater (Professor in Human Computer Interaction), Professor Alin Achim (Professor of Computational Imaging), Professor Dimitra Simeonidou (Head of Smart Internet Lab and Director BDFI), Dr Tilo Burghardt (Senior Lecturer in Visual Biometrics); Professor Iain Gilchrist (Professor of Neuropsychology), Professor Mary Luckhurst (Professor of Theatre and Performance), Dr Paul Clarke (Senior Lecturer in Performance).

Line manager to (where appropriate): N/A

Internal Contacts:

- School and faculty staff
- School undergraduate and postgraduate students
- Staff and students in the wider university

External Contacts:

- Research collaborators
- General public and stakeholders

3. The Post: Person Specification

The person specification provides a summary of what is required to carry out this role effectively. It also forms the selection criteria on which the decision on whom to short-list and then whom to appoint will be made. Please ensure that you demonstrate how you meet these criteria in your application.

3.1 Relevant Experience, Skills and Knowledge

Essential

- Experience, track record or clear potential in **one or more of the topics listed (or related to them) in section 2.1.**
- A clear passion, ability and potential to innovate and deliver world-leading research.
- Strong project management and organisational skills.
- A commitment to share knowledge in an enthusiastic and effective manner.
- A desire to publish papers in top venues relevant to the area of research.
- A desire to collaborate with both academic and industrial partners.

Desirable

- Entrepreneurial interests, to exploit research results, to work with industry, start-up companies, spin-outs etc.

3.2 Relevant Qualifications

Essential

- A good honours degree in Electrical/Electronic Engineering, Computer Science or a related discipline

Desirable

- Relevant industrial/commercial experience.

3.3 Communication and Interpersonal Skills

Essential

- A high standard of spoken and written English.
- An ability to work effectively independently and within a team.
- An ability to work with colleagues from other complementary disciplines.
- Enthusiastic and flexible with a positive attitude to change and inclusion.
- Outstanding interpersonal skills.

4. MyWorld Strength in Places Programme

MyWorld is creating a world-leading collaborative environment with innovation at its core. By fostering new relationships across technical R&D and experimental creative production, it will build regional collaborations with global reach. These in turn will fuel inward investment, create growth and add value to our already vibrant creative cluster.

We are at an inflexion point where a convergence of mixed reality, virtual production, AI and advanced delivery technologies will transform the way we create, deliver and consume content in order to enable new experiential spaces (e.g., the Metaverse). To enable the UK to maintain and grow its internationally leading position, MyWorld addresses some of the big creative-technology challenges facing our sector, combining technology and production research in a translational pipeline. Its focus includes: building collaborative and interactive worlds with seamless interfaces between the physical and virtual; delivering these new experiences to massive audiences across networks of the future; understanding immersion and the real impact of new technologies, enabling us to create more

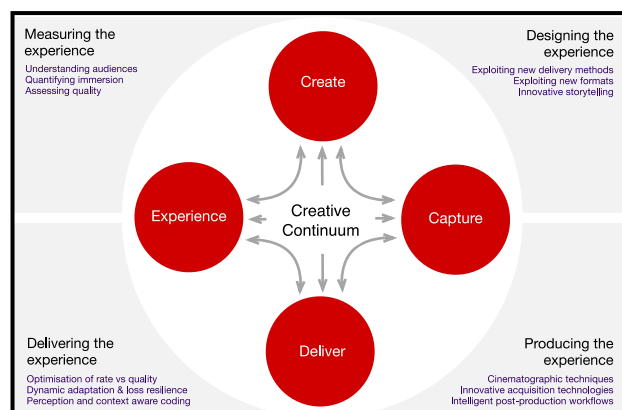
engaging experiences; fully exploiting the use of AI to transform the production and delivery of new experiences, while sustaining the planet's resources.



MyWorld delivers:

- **Research** - enabling future creative experiences through pioneering new media formats, content acquisition, post-production and delivery methodologies and means of understanding audience engagement. At the heart of the Programme is an R&D framework which spans the creative continuum of production, delivery and consumption, with investments being made at all levels - from basic interdisciplinary research, through R&D and experimental productions, to pre-production prototyping and demonstration.
- **Skills training** – developing talent across the sector through investments in advanced digital skills programmes, delivered jointly with cluster partners and local government. These will enable us to share expertise more widely within our cluster. A new MSc in Immersive Technologies has been established and a short course portfolio has been initiated.
- **World-leading facilities** - enabling the creation of more immersive user experiences. The University has invested some £25m to transform a heritage building into 2000sqm of state-of-the-art research facilities. These significantly enhance our existing infrastructure and include an Experimental Studio (mixed reality, virtual production and AI workflows), an Immersive Auditorium, a Distribution Gallery, and Post-production, World-Building and Immersive Experience (psychophysical experimentation) Suites. They are complimented by training, partner co-location and networking spaces, networked via an advanced IT infrastructure. They are coupled with an operational structure that seamlessly supports both fundamental research, collaborative R&D and some commercial usage.

Pathfinder research in MyWorld address long-term challenges in the Creative Continuum, upon which hinge future creative technologies. These will inform, and be informed by, a series of experimental showcase productions. An Open Innovation programme supports collaborative R&D, driven by industry challenges. The MyWorld pathfinder programme comprises the following activities:



Pathfinder 1 – Intelligent content creation and production: To underpin the next generation of intelligent acquisition and production tools and technologies, accelerating current tasks, enabling new experiences and enhancing quality.

Pathfinder 2 – Perceptually optimised delivery and interactivity: To characterise relationships between content type, format, coding artefacts, viewing environment and network parameters, exploiting this to optimise transmission performance.

Pathfinder 3 – Audience understanding: To develop objective quality metrics and long-form continuous immersion measures, validated in both the lab and in the wild using WP1.4 content.

Experimental productions: To test and showcase the results of the programme through the production of award-winning content by world-leading creatives. To highlight challenges that will inform our R&D priorities.

5. Bristol Vision Institute (BVI) and Visual Information Lab (VI-Lab)

The University of Bristol has a leading international reputation in vision-research, spanning human and animal vision, artificial vision, visual information processing and the creative arts. **Bristol Vision Institute** (BVI), formed in 2008 and hosting over 160 researchers, has created an intellectual landscape alongside shared laboratories for vision research, and has facilitated engineers and scientists working together with experts in medicine and the creative arts. It is one of the largest inter-disciplinary groupings of its type in Europe, and is unique worldwide.

BVI has been highly successful in attracting research income and stimulating new relationships with an impressive list of academic collaborators including: Max Plank Institute Tuebingen, Fraunhofer HHI Berlin, Purdue Univ., Univ. Cambridge, UCL, UCSD, Univ. Nantes, Univ. Aachen and UWA; BBC, QinetiQ, EADS, Dolby, Human Engineering Ltd. Recent industry partners include: Netflix, YouTube, NTT, Amazon, BBC, BT, General Dynamics, DSTL, Aardman, Thales, Samsung and XMOS. BVI hosted an EPSRC Platform grant in Vision Science from 2015-2020. It is a partner in the Bristol and Bath Creative Industry Cluster and its work underpins the MyWorld Strength in Places Programme.

(See www.bristol.ac.uk/vision-institute)

The **Visual Information Laboratory** (VI-Lab) is a core group within BVI, known for its innovative research in computer vision, image and video communications, content analysis and distributed sensor systems. With over 70 members, this now represents one of the largest groupings of its type in the UK. Its research activities are supported by EPSRC, UK government, Europe and industry and it has been a core partner in major consortia including the DIF-DTC, the EPSRC IRC SPHERE, the Marie Curie ITN PROVISION, the ISCF/AHRC Bristol and Bath Creative Industry Cluster and the MyWorld Strength in Places Programme.

Current primary research areas within VI-Lab can be categorised as follows:

Visual communications and creative technologies

- Image and video compression and rate-quality optimisation; Perceptual analysis of video, quality assessment and metrics, immersive measurements; Intelligent image and video production workflows.

Fine-Grained Object Interactions and Egocentric Vision

- Fine-grained actions, interactions and activities; Temporal Modelling and interpretable models; Multi-modal video understanding.

Simultaneous Location and Mapping

- Virtual, augmented and mixed reality systems; Video tracking; Simultaneous Location and Mapping (SLAM).

Vision for autonomous systems and robotics

- Real-time tracking, Object recognition, Active Vision; Personal and mobile robotics, robot vision; Wearable computing.

Computational Imaging

- Statistical and sparse image processing; Medical and biological image analysis; Remote sensing and earth observation.

Vision for digital health

- In-home monitoring; Human movement assessment and person re-identification; Clinical computer vision.

Visual biometrics

- Robust Visual Detection and Identification in Unconstrained Environments; Animal Recognition, Identification, Actions and Activities; Computer Vision applied to the Biological Sciences and Farming.

(See www.bristol.ac.uk/vi-lab).

6. The Faculty of Engineering

The Faculty of Engineering is one of the six Faculties that form the academic organisation of the University of Bristol. Our vision is to have a perpetual positive impact in the world. We are driven to create a more prosperous, sustainable, resilient and safer future through the ingenuity of engineering. We creatively apply our world-leading knowledge and expertise to global societal challenges, demonstrating excellence and impact as recognised by REF14. We flourish because of our diverse community of committed and talented academic, technical and professional staff and undergraduate and postgraduate students. The Faculty is home to over 500 members of academic staff, including around 300 research staff, and 50 teaching staff. The Faculty has around 150 professional services (including technical) staff and around 3000 taught and 400 research students. Around 32% of our cohort are overseas students, and we have a strong international staff body; we actively celebrate and support this diversity.

We have six academic departments within two Schools: the School of Computer Science, Electrical and Electronic Engineering and Engineering Mathematics (SCEEM) and the School of Civil, Aerospace and Mechanical Engineering (CAME). The six departments provide the academic home for our students and academic staff. Our Technical Services are delivered at Faculty-level and underpin all our teaching and research. The Faculty's Industrial Liaison Office (ILO) provides opportunities for students to engage with industry during their studies, supports research collaboration with external partners and is also home to the Faculty's Research Support Network, a team of professional research managers and administrators who support major research activities.

Through our research excellence and exceptional learning environment we aim to inspire the next generation of world-changing engineers; helping our students to reach their full potential to enable them to tackle the challenges of a future that we are yet to imagine. We offer a diverse range of programmes at undergraduate and postgraduate level across the schools, including a number of successful taught masters courses and innovative interdisciplinary programmes. We lead Centres for Doctoral Training in Composites, Quantum Engineering, Robotics, Ultrasonics and Non-Destructive Testing, Cybersecurity, Digital Health, Communications, Water Informatics and Artificial Intelligence and are involved in several others, including Nuclear and AI.

Our inspiring, collaborative and highly dynamic research environment includes access to world-class facilities, in which the University continues to invest – National Composites Centre, Earthquake Shaking table, Smart Internet Lab, Bristol VR Lab, Bristol Robotics Laboratory - see <http://www.bristol.ac.uk/engineering/facilities> for a full list.

We see co-creation and collaboration as critical to successful research and innovation; working in partnership – with other academic disciplines, government, third sector, spin outs, SMEs,

multinationals – inspires us to dig deeper, try harder and achieve more. We enjoy close and productive relationships with many key industry players across a range of sectors and the ILO helps to manage these partnerships on behalf of the Faculty.

With the launch of the new University strategy in 2016/17, and a commitment to invest in the infrastructure of the institution, there is a once in a lifetime opportunity to ensure Engineering at the University of Bristol is truly world-leading so we are currently in the early stages of an ambitious programme to deliver transformational change. Significant growth is planned in staff and student numbers, alongside an expansion and enhancement of our teaching and training, and increased internationalisation. We are making a major investment in physical spaces within the campus, and across the city, to support world-class research and teaching.

The programme will better enable the Faculty to:

- Apply world-leading research to global and societal challenges
- Inspire and develop future leaders through challenging educational offerings
- Partner with global and local innovators to accelerate impact
- Advance equality and diversity

Alongside this, the University is building a major new campus in central Bristol. The Temple Quarter Enterprise Campus will focus on social and digital innovation and the ethics, business models and infrastructure needed to turn digital opportunities into jobs, wealth and wellbeing for all. The Faculty of Engineering will be instrumental in the mission of the campus, which will host the Quantum Technology Innovation Centre and the Bristol Digital Futures Institute as well as a number of our world-leading research groups and Centres for Doctoral Training.

We are striving to continue to increase the diversity of our community, including, but not limited to, gender, ethnicity, disability, background and experience, as we are committed to the idea that diversity drives innovation, creativity and impact, thus strengthening the Faculty and enabling it to achieve its vision. We are happy to discuss the possibility of job share, or of part time or flexible working patterns to assist with caring responsibilities.

7. The University and the City of Bristol

The University of Bristol's roots date back to 1876. Since its formation it has become one of the leading institutions among the UK's Russell Group of universities and operates globally, where it is recognised for its research and academic excellence. The University has a strong interdisciplinary approach and regularly features among the top ranking institutions in global league tables.

The University of Bristol's mission is '*to pursue and share knowledge and understanding, both for their own sake and to help individuals and society fulfil their potential*'. This is underpinned by a vision where the University of Bristol is an international powerhouse of learning, discovery and enterprise, whose excellence is acknowledged locally, nationally and globally, and that is:

- Dedicated to academic achievement across a broad range of disciplines, and to continuous innovation and improvement
- Research-intensive, supporting both individual scholarship and interdisciplinary or thematic research of the highest quality
- A centre for intellectually demanding, research-informed education that nurtures independence of mind and helps students achieve their personal goals and serve society's needs, both during and after their time here

- An inclusive and collaborative community of scholarship that attracts and retains people with outstanding talent and potential from all walks of life and all parts of the world
- A stimulating and supportive environment for all students and staff, distinguished by a commitment to high standards, respect for the individual and a strong sense of collegiality
- Committed to operating in a sustainable manner
- Engaged with society's interests, concerns, priorities and aspirations
- A major contributor culturally, environmentally and economically to Bristol and the Southwest
- Well led and responsibly run, with an emphasis on consultative decision-making and open communication as well as personal responsibility and accountability

Key to Bristol's vision is a clear and consistent articulation of and dialogue with its many stakeholders and the public about the wide range of research carried out at the Institution and hence is often featured in many national and international media. It has a proud history of two-way dialogue as part of its research activities and addresses the world's key challenges through an interdisciplinary approach.

The University also plays a lead role in the city of Bristol's cultural and economic well-being and carries out an extensive programme of events and activities on behalf of the city, as well as being a keen supporter of partner organisations' activities.

For more information, please see <http://www.bris.ac.uk/university/>

8. Equality, Diversity and Inclusion

The University is committed to Equality, Diversity and Inclusion and to creating an environment where all staff can 'Thrive'.

As a leading global institution, we are keen to attract the most highly talented individuals from a diverse range of backgrounds. Further information on our commitment to equality and diversity can be found at: <http://www.bris.ac.uk/jobs/diversity.html>

We are committed to creating and sustaining a positive and mutually supportive working environment for our staff and an excellent teaching and learning experience for our students, where staff are equally valued and respected, and students are encouraged to thrive academically. We offer a broad range of services, activities and initiatives to enhance our staff experience of working at Bristol. For more information please visit: <https://www.bristol.ac.uk/hr/wellbeing/>

9. Terms and Conditions

- (a) We would like the successful applicants to take up the appointment as soon as possible in 2022.
- (b) The post is located in the **Faculty of Engineering, Merchant Venturers Building and ! Cathedral Square, moving to the MyWorld Creative Hub in 2023.**
- (c) The stipend will be a minimum of **£15,609 with possibilities for enhancement by up to £3,000 per annum.**
- (d) This post is **full time.**

(e) The posts are funded either over **3 or 4 years (dependent on funding source)**, with PhD submission thesis expected within 4 years. Academic fees are included in each MyWorld Scholarship. All scholarships cover fees for UK based students. A significant number also cover EU-based students and a proportion cover international students.

10. Application Procedure and Selection Process

Please visit our web site at www.myworld-creates.com for details of these posts.

Please note the following:

- All candidates should submit a full CV and covering letter to myworldrecruitment@myworld-creates.com (FAO: the contact of the research topic that you are applying for) by the deadline.
- Formal applications for PhD are not essential at this stage, but can be submitted via the University of Bristol homepage (clearly marked as MyWorld funded):
 - <https://www.bristol.ac.uk/study/postgraduate/apply/>
- A Selection Panel will be established to review all applications and to conduct interviews of short-listed candidates.
- Candidates will be invited to give a presentation prior to their formal interview, as part of the final selection process. It is expected that the shortlisting selection process will be held in week commencing **April 4th 2022, with interviews to follow.**
- **The initial closing date for applications is Friday April 1st 2022.** The positions will however remain available until all scholarships are awarded.

11. Additional Information

For an informal discussion about the scholarships, please contact:

Professor David Bull, Director MyWorld, Director Bristol Vision Institute (All projects).
dave.bull@bristol.ac.uk

Dr. Aaron Zhang, Lecturer in Visual Communications (Content delivery projects)
Fan.zhang@bristol.ac.uk

Dr. Pui Anantrasirichai, Senior Lecturer in Creative Technologies (Content acquisition and post-production projects)
Pui.anantrasirichai@bristol.ac.uk

Professor Andrew Calway, Professor of Computer Vision (SLAM and tracking for Virtual Production)
andrew.calway@bristol.ac.uk

Prof Dimitra Simeonidou, Head of Smart Internet Laboratory and Director BDFI (Networks)
dimitra.simeonidou@bristol.ac.uk

Prof. Iain Gilchrist, Professor of Neuropsychology (Audience understanding projects)
i.d.gilchrist@bristol.ac.uk

Prof Kirsten Cater, Professor of Human Computer Interaction (Experimental production related projects)
kirsten.cater@bristol.ac.uk