BVI Refresh
News and Events from Bristol Vision Institute
Spring 2019

Annual Events

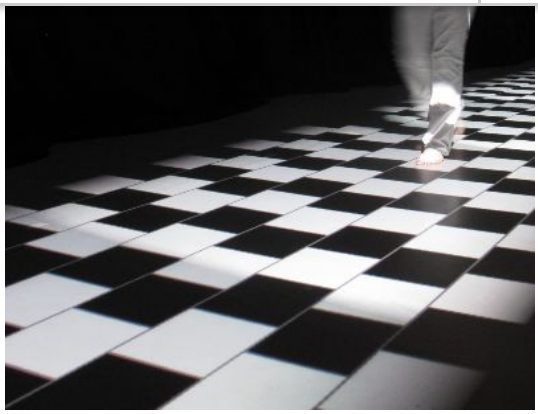
Vision Researchers Colloquium

Last July, over 100 vison researchers attended our annual Vision Researchers Colloquium and Jenny Read, from Newcastle University's Institute of Neuroscience gave the excellent keynote speech. This year, Exeter will be hosting the event, open to GW4 universities. Email bvi-enquiries@bristol.ac.uk to keep informed about the proposed date and venue.

Read more

range of subjects, from Animation in New York to Sensory Alignment and Animal Vision.

This term **we are returning to the** Life Sciences Building and will be hearing about action recognition and the dynamics of live audiences amongst other topics. As always, drinks and nibbles will follow each seminar (which run from 4.00-5.00pm) providing a great opportunity to network with those interested in the world of vision research.



Come along to our 2019 seminars!

Richard Gregory Memorial Lecture

The 2018 Memorial Lecture **'**Exploring the Edges of Perception**'** was delivered by Luke Jerram to a packed lecture theatre. Luke told stories and shared photos and videos of his many artworks, showing how visual illusions that challenge visual perception continue to be a part of his practice.

Read more

The Impossible Garden - launched summer 2018

In 2018, post a nine-month residency with BVI and the Bristol Eye Hospital sponsored by the Leverhulme Trust, local artist Luke Jerram created 'The Impossible Garden'. Twelve experimental sculptures were placed in the University of Bristol's Botanic Garden, designed to help promote understanding and stimulate debate about how visual impairments can affect our perception of the world.

The exhibition welcomed over 15,000 visitors throughout the period of July to November and Cathy Williams, Reader in Ophthalmology at Bristol Eye Hospital said, 'As an artwork it has been more effective at communicating complex ideas about vision than I ever imagined.'

Read more

What is the Impossible Garden? Hear from BVI researchers and artist Luke Jerram.

BVI welcomes...

BVI management team: Dr Angela Piccini and Dr Kristian Moen from the School of Arts/Film and Television will alternately attend monthly BVI management meetings.

Engineering: Alexandra Malyugina and Sanat Nagarju started their PhD within the VI Lab, supervised by Professor Dave Bull.

School of Arts: Professor Mary Luckhurst is due to start as the Head of the School of Arts on 28 January, taking over from Neal Farwell.

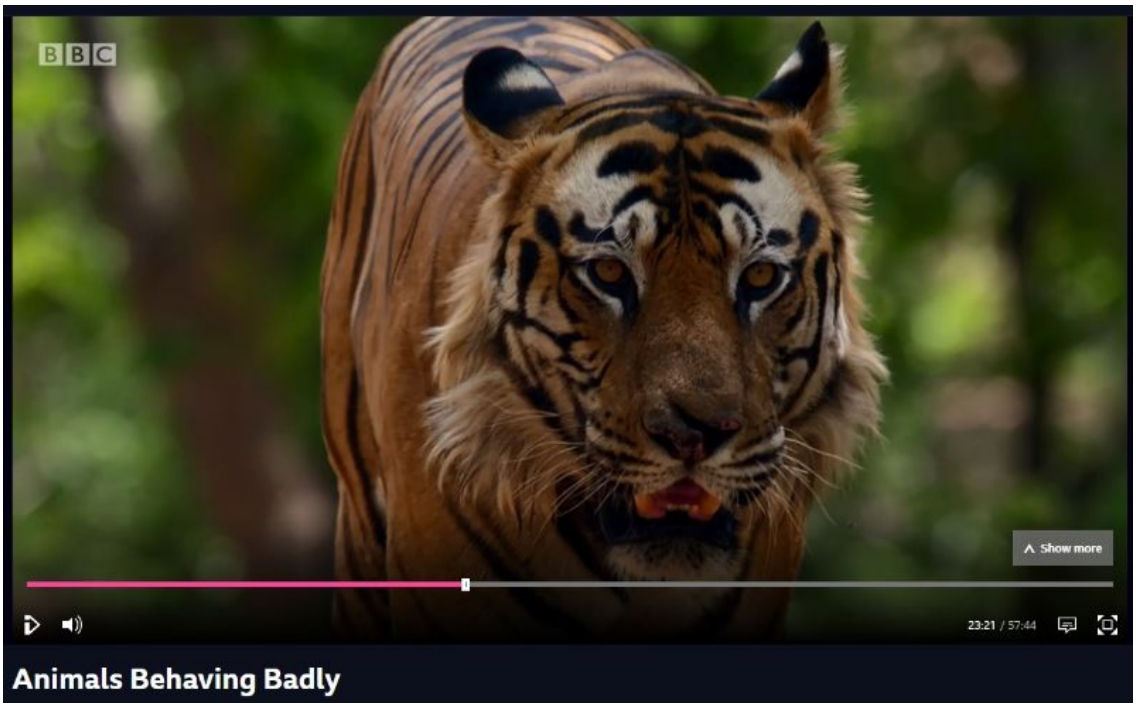
School of Biological Sciences CamoLab: Callum McLellan and Doug Sands started their Masters by Research, with Innes Cuthill and Nick Scott-Samuel as supervisors.

School of Psychological Science: Greig Dickson starts his PhD on the UrbanVisionScience project, with Ute Leonards and Jeremy Burn as supervisors. And Hugo Hammond starts his PhD, sponsored by the BBC and supervised by Professors Iain Gilchrist and Dave Bull.

Visual Movers and Shakers

The Visual Information Lab has moved...

...to brand new premises at the bottom of Park Street, 1 Cathedral Square (Trinity Street, Bristol BS1 5TE). They share the space with SPHERE and QTIC. These modern, light and airy premises house over 50 PhD students and researchers, who have access to three state-of-the-art laboratories (Studio and Edit Suite/Psycho Physics and Subjective Testing). Do come and see us and use the hot desk space.



Dr. László Talas and Dr. John Fennell, two BVI researchers appeared in a new BBC Natural History documentary entitled **"Animals Behaving Badly"** which aired on BBC1 in July and PBS in America in April.

During the programme, László and John discussed different colour visual systems in nature, in particular those of prey animals. They highlighted how tigers, due to their dichromacy (they can't distinguish red and green), see the orange coat of tigers as the same colour as the green vegetation around them. During the documentary John demonstrated the experience of dichromatic vision by wearing a pair of glasses that simulated the effect.

VI Lab success in Huawei Image de-noising competition

A team comprising VI-Lab PhD student, Alexandra Malyugina, Dr. Paul Hill and Prof David Bull were placed fourth from over 130 proponents in an image denoising competition organised by Huawei. The competition required entrants to clean up a dataset of noisy images and the results were assessed through various objective metrics and subjective tests. The team's solution employed a denoising architecture, based on deep learning, trained to understand and correct for the characteristics of various noise types.

Research News

ISCF/AHRC Creative Industry Cluster Award

'Bristol & Bath Creative R&D' has received a multi million pound investment from the Arts and Humanities Research Council's Creative Industries Clusters Programme, one of nine from the Government's Industrial Strategy. The Bristol and Bath Creative cluster combines the strengths of the Universities of Bristol, Bath, Bath Spa and UWE and has been identified by the Bazalgette Report as one of three regions outside London to have international growth potential, contributing £780m back to the Treasury, mainly from small and micro businesses.

Through a mix of fellowship schemes and large project funding, this programme will build on existing thematic strengths in the region including XR (immersive experiences), live performance, voice activation and 5G. Partners in designing and delivering the programme include BBC, BDH, Crack Magazine, Creative Bath, Open Bionics, Yellow Dog, TLT Solicitors. Drummer films,

Read the press release here.

EU H2020 MultiDrone - Viewing Experiences of Drone Videos

During aerial video capture, drone and camera movement and the relative motion between camera and target can have a major influence on viewer experience. The relationship between various scenarios, shot types and drone parameters has been investigated by PhD student Stephen Boyle, Dr Fan Zhang and Professor David Bull. Using simulated scenarios based on the UE4 graphics engine, they have characterised the operating envelopes for drone cinematography for specific scenarios and shot types through subjective evaluation.

University Strategic Research Fund Project Award on "URBAN VISION"

URBAN VISION - Understanding the impact of visual environments of cities on physical and mental well-being" is led by BVI member Dr Ute Leonards. The project is in collaboration with colleagues from Engineering (Dr Dima Damen, Professor Colin Taylor, Professor David Bull) and the Social Sciences (Professor Angie Page, Professor Bill Browne) and approaches the City of Bristol as a living lab to understand the sensory impact of city infrastructure on citizens' health and well-being.

The UrbanVisionScience project tackles questions such as how we can create urban environments that encourage people to travel more actively and what the role of sensory information might be in this. Starting with visual information, a current case study aims at understanding how sensory information affects people's walking behaviour, improves people's experiences of spaces, and encourages greater and more inclusive use of public infrastructures.

Find out more

Predator-prey and prey-prey interactions driven by predator visual attention

Christos Ioannou and Innes Cuthill (Biological Sciences) have been awarded a new Leverhulme Trust research grant, jointly with Colin Tosh of Newcastle University. The grant for £226k, lasts three years. Bristol-based postdoc, James Herbert-Read, will construct visual saliency maps of shoaling fish. Dan Reed in Newcastle will test predictions on both sticklebacks in the lab and guppies in the wild (streams in the highlands of Trinidad).

State-of-the-art eye tracker at Bristol Eye Hospital

Cathy Williams, Iain Gilchrist and Rosie Clark have been working on a new BVI initiative to establish a clinical eye tracking service in the Bristol Eye Hospital to support both clinical assessment and research. Through the financial support of the Bristol hospitals charity Above and Beyond, they now have a state-of-

They also have an EyeSeeCam which was provided by an industrial sponsor.

Objective eye tracking has the potential to aid clinicians in the diagnosis and management of many disorders, yet very few centres offer this service; eye movement assessment in clinic is primarily done qualitatively by clinical judgement. There is also a clear benefit of objective eye tracking to patients, to streamline the diagnostic pathway and improve accuracy. Further development of this initiative will involve work on a suite of patient-friendly eye movement tests, and a creating a pathway for clear interpretation of results by clinicians.

Vision for optimisation of jumping manoeuvres

Researchers from BVI, Dr Kat Daniels and Dr JF Burn have shown that domestic dogs are able to use visual information acquired when approaching an obstacle to minimise mechanical energy cost for the jump. The work was published in the Journal of Experimental Biology.

Concealing 3D objects

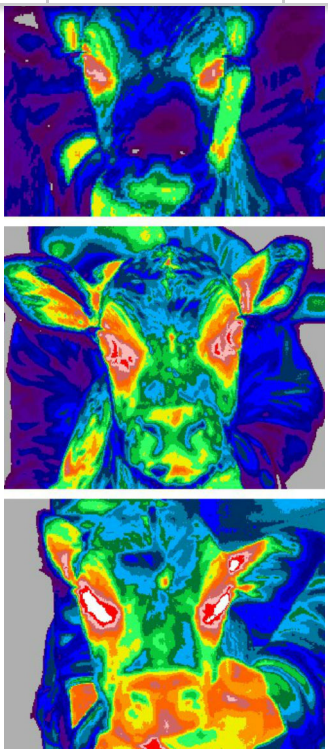
Innes Cuthill (Biological Sciences), Nick Scott-Samuel and Roland Baddeley (Psychological Science) have been awarded a BBSRC research grant to investigate 3D camouflage. This three year grant, valued at £760k will use a mixture of field experimentation, visual modelling and deep learning to investigate camouflage in snails, cats and humans.

Bristol researchers win EPSRC fellowship to develop AI for early disease diagnosis in calves

Dr. John Fennell and Dr. Laszlo Talas, two BVI researchers, have been awarded a joint Engineering and Physical Sciences Research Council (EPSRC) UK Research and Innovation (UKRI) Fellowship to investigate early disease diagnosis in dairy calves using artificial intelligence (AI) methods.

The fellowship aims to contribute to the reduction in antimicrobial resistance and introduce AI techniques to veterinary practice.

Thermography can reveal various stages of BRD. From top to bottom: thermographs of a healthy calf; calves with symptoms of early stage; and late stage BRD. Image credit: Laszlo Talas



Read more

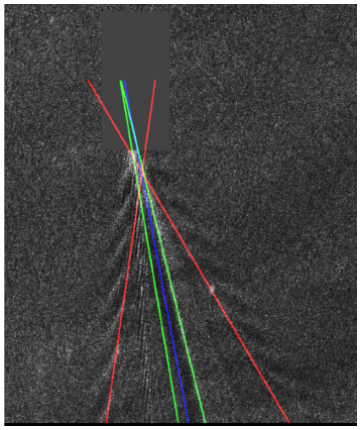
Automatic quantification of line artefacts (B-lines)

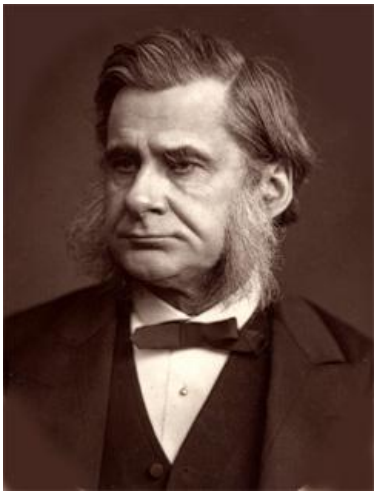
A VI Lab team coordinated by Professor Alin Achim has been successful in securing an EPSRC Impact Acceleration Award to develop a method of automatic quantification of line artefacts (B-lines), present in lung ultrasound images. B-lines are indicative of fluid overload in children with chronic kidney disease.

Specifically, by using sophisticated techniques of representing lines in digital images, the developed methodology discriminates B-lines from other types of line artefacts occurring in lung ultrasound images. This enables clinicians to determine the appropriate amount of liquid to be removed from children under dialysis. This work partners with Toshiba Medical Systems UK.

Assessment of Sea Surface Signatures using SAR Imagery (AssenSAR)

Professors Alin Achim, Dave Bull and John Hogan have been awarded a new EPSRC funded research project aimed at detecting the type and trajectory of sea vessels from their sea surface signature, based on satellite imagery. The results will be important in the detection and tracking of illegal vessels involved in smuggling goods or humans. They will also be indicative in terms of understanding and classifying the characteristics of the wake generating vessel. As a consequence, the work will directly benefit the design of stealthy vessels that can avoid such detection, reducing the risk to naval operations.





Professor Innes Cuthill has been invited to write the **2019 Thomas Henry Huxley Review for the Journal of Zoology,** on the topic of, surprise surprise, camouflage.

Thomas Henry Huxley (1825–1895) was an outstanding British zoologist famous for his work on comparative anatomy, physiology and evolutionary biology. Huxley was also known as 'Darwin's bulldog', due to his advocacy for Darwin's theory of evolution by natural selection.

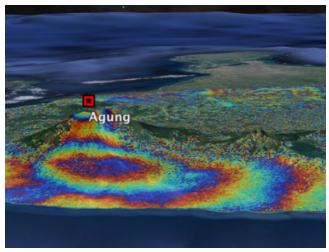
The Thomas Henry Huxley review series, published in the Journal of Zoology, aims to celebrate Huxley's outstanding contributions to zoological research. Indeed, many of Huxley's own papers were published in the Proceedings and Transactions of the Zoological Society London, which merged in 1966 to form Journal of Zoology.

(Photo: Not Innes Cuthill. Courtesy of Wikimedia Commons under CC-BY 2.0 license)

Read more

VI Lab researchers, led by Dr Dima Damen, released EPIC-KITCHENS, a dataset filmed in 32 kitchens across four cities. The films, which include 11.5 million images, have been annotated with 40,000 action examples and half a million objects. This ground-breaking dataset will help machines to learn and advance first-person vision, enabling improvements in robotics, healthcare and augmented reality. Read more here.

Monitoring and forecasting volcano activity



A joint workshop, funded by an EPSRC GCRF sponsorship, between VI Lab and the Volcanology Research Group, brought two communities together to learn about new methods and their applications, and initiate future collaboration within the University of Bristol and externally with the Centre for Observation and Modelling of Earthquakes, Volcanoes and Tectonics (COMET), Leeds.

As a result of this collaboration, two new research grants have been awarded - a collaboration between Juliet Biggs in Earth Sciences and Dr Pui Anantrasirichai, Dr Paul Hill and Professor David Bull in VI Lab. The first, Making Satellite Volcano Deformation Analysis Accessible has been awarded under the NERC Innovation Call, and the second, a NERC Research Grant entitled 'Digital Environment: Dynamic Ground Motion Map of the UK'. These projects exploit satellite-based volcano geodesy and machine learning algorithms to develop new ways of automatically searching through large volumes of InSAR images to detect patterns that relate to volcanic activity.

Please stay in touch!

To stay informed about research opportunities, events, general updates, or for any comments about this newsletter, please email us on bvi-enquiries@bristol.ac.uk and follow us on Twitter!