University of BRISTOL

11th Vision Researchers Colloquium

Monday 8 July 2019

Living Systems Institute, University of Exeter

Keynote speaker Barbara Webb
Professor of Biorobotics
University of Edinburgh

In partnership with:

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Programme

09:30	**Registration, tea, coffee, pastries**
09:55	**Welcome by BVI Director, Professor David Bull, University of Bristol and host Professor Natalie Hempel de Ibarra, University of Exeter**
	Chair: Nikita Thomas, Cardiff University
10:00	**Bok, Michael** - University of Bristol**: Fundamentals of a startle response: Wiring the diverse distributed eyes of fan worms**
10:20	**Yuan, Hellen Jing -** Cardiff University**: Neural responses to visual flickers of a wide range of frequencies**
10:40	**Harris, David** - University of Exeter**: The promise and problems of training visuomotor skills in virtual reality**
11:00	**Kearney, Sinead** - University of Bath**: Animal motion capture from images and kinetics**
11:20	**Break – tea and coffee**
	Chair: Dmitry Kangin, University of Exeter
11:45	**Hartley, Thomas** - Cardiff University: **Explaining Failure: Visualisation of Surprise and Expectation in CNNs**
12:05	**Hall, Katie** - University of Exeter: **Activity patterns of foraging bumblebees under varying levels of natural light**
12:25	**Matchette, Sam** - University of Bristol: **Camouflage in a dynamic world**
12:45	**Wainwright, Benito** - University of Bristol: **Overcoming the predation costs of bilaterally symmetrical colouration**
13:05	**Lunch and poster presentations, tea and coffee**
	Introduction of keynote by Professor Innes Cuthill, University of Bristol
14:30	**Keynote: Barbara Webb, Professor of Robotics,** University of Edinburgh: **Visual navigation in insects and robots**
	Chair: Dr Angeliki Katsenou, University of Bristol
15:30	**Galloway, Jim** - University of Exeter: **Colour vision and colour change for camouflage in Carcinus maenas, the green shore crab**
15:50	**Muchhala, Mubaraka** - University of Bristol*:* **The geometry of high-level colour space**
16:10	**Bracho, Diego** - University of Bristol: **Study and design of multilayer optical filters for colour correction in red-green anomalous trichromats**
16.30	**Bossard, Martin - Cardiff University: Is illusory jump illusion global or local process?**
16:50	**Close – Professor Dave Bull**
17:00	**Informal drinks reception**

Keynote

Barbara Webb
Professor of Biorobotics
University of Edinburgh

Visual navigation in insects and robots

Abstract
Many insects have excellent navigational skills, covering distances, conditions and terrains that are still a challenge for robotics. The primary sense they use is vision, both to obtain self-motion information for path integration, and to establish visual memories of their surroundings to guide homing and route following. Insect vision is relatively low resolution but exploits a combination of sensory tuning and behavioural strategies to solve complex problems. For example, by filtering for ultraviolet light in an omnidirectional view, segmentation of the shape of the horizon between sky and ground becomes both simple and highly consistent.

We have shown this approach can be used on a robot to reliably recognise location, even under different weather conditions or variations in pitch and tilt. Insects may use a specific behavioural strategy in navigation of aligning themselves to views they have stored when facing or following a route to a goal. We have investigated, using computational modelling and robot implementations, how the small brain of an insect might support the rapid learning of hundreds of images along a route. Our modelling approach has made it possible to link insights from field experiments to neural data, and thus derive and test novel hypotheses about visual navigation in insects.

Biography
Barbara Webb completed a BSc in Psychology at the University of Sydney then a PhD in Artificial Intelligence at the University of Edinburgh. Her PhD research pioneered the use of embodied robot models to evaluate biological hypotheses of behavioural control and was featured in Scientific American. The focus of her research is on insects but has moved from basic sensorimotor control towards more complex behavioural capabilities, such associative learning and navigation. She has held lectureships at the University of Nottingham and University of Stirling before returning to a faculty position in the School of Informatics at Edinburgh in 2003. She was appointed to a personal chair as Professor of Biorobotics in 2010.

https://www.edinburgh-robotics.org/academics/barbara-webb

Posters

1	**Briolat, Emmanuelle** – University of Exeter: **The role of colour for contour-following behaviour in bumblebees (Bombus terrestris)**
2	**Burtan, Daria** – University of Bristol: **Impact of visual exposure to natural environments revisited: aesthetics preferences impact gait dynamics**
3	**Dickson, Greig** – University of Bristol: **Walking on illusions - the impact of perceived pattern depth on locomotive foot placement**
4	**Dimitrov, Goce** – University of Bristol: **Subjective Video Quality Assessment Software**
5	**Gamble, Ryan** – Cardiff University: **The short-term effects of diverging multi-media optokinetic stimulation on perceptual and postural indicators of persistent postural perpetual dizziness (PPPD): a rehabilitative approach**
6	**Halchin, Adelina-Mihaela** – Cardiff University: **Perceptually organized stimuli have preferential access to consciousness**
7	**Hammond, Hugo** – University of Bristol: **Developing an online multivariate model of immersion in film and TV**
8	**Hiley, Liam** – University of Bristol: **Discriminating Spatial and Temporal Relevance in Deep Taylor Decompositions for Explainable Activity Recognition**
9	**Hill, Paul** – University of Bristol: **Habnet: Spatio-temporal based machine learning network for remote sensing based (harmful algal bloom) event detection**
10	**Holmes, Alexander** – Cardiff University: **Vection onset times in individuals with visual vertigo**
11	**Kangin, Dmitry** – University of Exeter: **TRPO-REPLAY: Trust Region Policy Optimisation with Replay Buffers**
12	**Katsenou, Angeliki** – University of Bristol: **A Subjective Comparison of AV1 and HEVC for Adaptive Video Streaming**
13	**Lim, Anna** – University of Bristol: **Disco Chickens: Can structural iridescence function as camouflage?**
14	**Ma, Di** – University of Bristol: **Perceptually-inspired super-resolution of compressed videos**
15	**Malyugina, Alexandra** – University of Bristol: **Low-light Image Denoising with Deep Neural Networks**
16	**Masullo, Alessandro** – University of Bristol: **Analysis of Sit-to-Stand using silhouettes in the wild for long term health monitoring**

17	**Middleton, Rox** – University of Bristol: **Capturing Iridescence**
18	**Muftah, Asmail** – Cardiff University: **Deep Learning for Prostate Cancer Detection with multi-parametric MRI**
19	**Naruenatthanaset, Korranat** – University of Bristol: **Vision-based Abnormal Red Blood Cells (RBC) Detection and Classification**
20	**Skoczek, Kristian** – Cardiff University: **Crowding in glaucoma – Playing hide and seek with early signs of eye disease**
21	**Smith, Mark** – University of Bristol: **Active sampling of information for perceptual decisions**
22	**Wallis, Christian** – University of Exeter: **Efference Copy, Eye Movements, and Schizophrenia**
23	**Wells, Mason** – Cardiff University: **Psychophysical investigation of residual visual function in hemianopia**
24	**Xu, Qi** – University of Exeter: **On Tackling Adversarial Attacks in Deep Learning**
25	**Zhang, Aaron** – University of Bristol: **Enhanced video compression based on effective bit depth adaptation**

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