

**Fellow:** John Barbur, Professor of Optics and Visual Science, Applied Vision Research Centre, School of Health Sciences, City University London [[j.l.barbur@city.ac.uk](mailto:j.l.barbur@city.ac.uk)]

**Title of Research:** ‘Colour Vision Mechanisms and other Photoreceptor Interactions in Human Vision’

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The JSPS Invitation Fellowship lasted for just over three weeks and enabled me to visit a number of vision research laboratories, to experience the Japanese traditions, to form new friendships and to enjoy the cultural differences which make Japan so special and unique.

### **Department of Bioengineering, Kagoshima University**

**Host:** Professor Sei-ichi Tsujimura

I spent several days in Professor Tsujimura’s laboratory where we designed new experiments to examine how pupil size affects the ‘effective’ retinal illuminance in view of the directional sensitivity of cone photoreceptors. Discussions with Sei-ichi Tsujimura and Wakayo Yamashita also focussed on mechanisms for light-flux sensing and the functions of the melanopsin photosensitive pigment in the eye. A formal presentation to staff and research students on ‘Mechanisms for light-flux sensing in human vision’ was followed by extended questions and answers session with good audience participation.

### **Osaka University Hospital**

**Host:** Professor Takashi Fujikado

The visit focused on the optics of the eye with emphasis on the measurement of scattered light. Professor Fujikado and his team showed me some of their current experiments on retinal imaging using confocal imaging and the retinal implant studies. The merits of early detection of structural changes using imaging and / or functional changes using sensitive visual psychophysical tests were discussed. My lecture focused mostly on the new methods developed in our laboratory to assess small changes in red / green and yellow / blue colour vision and the application of these methods to the early detection of retinal and / or systemic diseases. Discussions continued after the lecture and we hope these will lead to collaborative projects.

### **Kobe University Graduate School of Maritime Sciences**

**Host:** Professor Masao Furusho

The International Maritime Organisation (IMO) symposium in Kobe was organised to address important international concerns regarding current practices in colour assessment and the setting up of minimum colour vision requirements for seafarers. Our experience in colour assessment and the setting up of minimum requirements for pilots formed the basis of four papers which were well received and generated interest and discussion. Short and long term solutions have emerged from the symposium which were summarised in a report to IMO.

### **Tokyo Kogakuin University, Shinjuku Campus**

**Hosts:** Dr Kowa Koida and Professor Sei-ichi Tsujimura

The annual meeting of the Vision Society of Japan was held at the Kogakuin University in Shinjuku, Tokyo. I was privileged to attend this meeting and to present a paper on *Light flux sensing in ‘Blindsight’*, as part of the special symposium on ‘Alternative vision’ organised by

Professor Tsujimura. I was thrilled to see the range of topics covered and the excellent scientific quality of the presentations.

### **Tokyo Institute of Technology**

**Hosts:** Professors Toshifumi Mihashi and Keiji Uchikawa

The visit to Tokyo Institute of Technology and the discussions I had with Professor Mihashi and his colleagues were stimulating and exciting. I am very grateful to Professor Mihashi for showing me the interesting and challenging experiments carried out in his laboratory and for being a wonderful host. It was a joy to meet other researchers from Professor Uchikawa's group and to attend the short evening symposium when I was given the opportunity to present our findings on variability in human colour vision and the consequences for colour assessment in clinical applications.

### **Yokohama State University**

**Host:** Professor Katsunori Okajima

I am grateful to Professor Okajima for inviting me to visit his laboratory. I had the opportunity to discuss a range of studies of mutual interest and I particularly enjoyed meeting Prof Okajima's research students with whom I had long discussions. I now have a much better understanding of the benefits offered by the Japanese University system to support research.



Some of the participants to the Kobe IMO Symposium, January 2014.

Front row (left to right): E. Livingstone (Australia), T. Sakamoto (Japan Ministry of Transport), M. Furusho (Kobe University), T. Carter (UK MCGA), P. Pratley (Kobe University), JL Barbur (City University London)