



## The Original Daltonian

John Dalton (1766-1844)

When our society changed its name – from *International Research Group for Colour Vision Deficiencies* to *International Colour Vision Society* – we did not change the name of our newsletter. ‘Daltoniana’ commemorates the man whose name provided the word for colour blindness in many European languages, including French, Italian, Portuguese, Russian, Serbian and Spanish.

So it is right that we should mark the 250<sup>th</sup> anniversary of John Dalton’s birth. He was born in early September, 1766, at Eaglesfield, a village of Cumberland in the north-west of England. His first biographer, Dr Henry, gives the date as September 5<sup>th</sup>, but the exact date is uncertain, since the Society of Friends – to which his family adhered – did not record births in the Anglican parish registers.

In a celebrated paper to the Manchester Literary and Philosophical Society in 1794, Dalton described how the pink cranesbill, *Pelargonium zonale*, appeared to him sky-blue by day but red in candlelight. He had been surprised to discover that his friends did not share his experience – although, tellingly, his brother did. In the solar spectrum, he could see ‘only two or at most three’ colours, which he called yellow and blue, or yellow, blue and purple. He wrote: “That part of the image which others call red, appears to me little more than a shade, or defect of light;” He recorded that the vermilion colour of sealing wax was a good match for the outer face of a laurel leaf.



# ICVS

Erlangen - Germany

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web: <http://icvs2017.fau.de/>

The 24th symposium of the International Colour Vision Society will be held in Erlangen, Germany, from **18 to 22 August 2017** in the Hörsäle Medizin Auditorium.

**About Erlangen:** With about 108,000 inhabitants, Erlangen is located in the district of Central Franconia in Bavaria, just 15 kilometres away from the neighbour cities of Nuremberg and Fürth. Frankfurt/Main, Munich and Stuttgart are ~200 km from Erlangen, with Prague (CZ) ~300 km and Berlin ~450 km.

Erlangen, the Huguenot town located in the heart of the Nuremberg Metropolitan Region, provides a lot to its visitors, including student flair, traditions which are still very much alive, and an open-minded atmosphere that are just a few attributes which make Erlangen so liveable and loveable.

The first historical mention of “Villa Erlangon” in official document was in the year 1002. The Auerbach town charter was granted by King Wenzel in 1398. By 1634 the Thirty Year War had devastated the city. The first Huguenot refugees arrived in 1686 and construction of the new baroque town “Christian Erlang” was completed. A great fire almost completely destroyed the old town in 1706. Erlangen University was founded in 1743 and twelve year later the famous “Erlanger Bergkirchweih” fair was first held. In 1945, the headquarters of the Siemens-Schuckert group moved from Berlin to Erlangen.

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Dalton himself attributed his defect to a blue medium within his eye, probably the vitreous. His contemporary, Thomas Young, however, had a more modern explanation. In a note on Dalton's paper he wrote: '...it is much more simple to suppose the absence or paralysis of those fibres of the retina, which are calculated to perceive red.'

The origins of the term 'daltonism' are Swiss. The first use of Dalton's name as an eponym was probably by the physicist Pierre Prévost, who in 1827 wrote in print of 'ceux que j'ai coutume d'appeler *daltoniens*': for some years before that date he had used the term in teaching at the Academy (later University) of Geneva. In April 1840, Elie Wartmann presented his 'Mémoire sur le Daltonisme' to the *Société de Physique et d'Histoire naturelle de Genève*, attributing the term for the actual condition also to Prévost. 'Daltonism' became familiar to English readers when Wartmann summarised his conclusions at the meeting of the British Association in Plymouth in 1841 and when his memoir was translated in Taylor's Scientific Memoirs in 1846.

The term was not well received in Britain. George Wilson wrote: 'Against the introduction of this term, a protest nearly unanimous has been entered in this country, and it is needless to insist on the many objections which apply to it.' And David Brewster (who favoured 'Colour blindness') complained: 'We cannot but regard it as degrading to the venerable name which it misapplies, and as one of the worst examples of vicious nomenclature'. But Dalton himself was unperturbed. Wilson records: "Nor does it appear that this phrase gave offence to Dalton, who was more amused than annoyed with his singularity of vision, and was always ready to satisfy the curiosity of others in reference to it."

The newsletter of our Society was called *Daltoniana* from the first issue. In that issue, Guy Verriest, our first General Secretary and the first Editor of the newsletter, offers no explanation of the name. We may guess that it was Guy's happy creation – and this is André Roth's recollection. The name has served us well.

John Dalton died on 27 July, 1844, after a fall. He had left instructions that his eyes should be examined upon his death, and the following day his physician, Joseph Ransome, conducted a post-mortem. Dissecting one eye, Ransome found the aqueous to be 'perfectly

pellucid' and the vitreous similarly to be 'perfectly colourless', while the lens showed the typical amber colour of age. Very shrewdly, Ransome left the second eye largely intact, simply making a vertical section through the posterior pole, so that objects of different colours could be examined through the eye. 'I did not omit', Ransome writes, 'to place scarlet and green together, as I knew that the Doctor was unable to discover any difference between the colour of the scarlet geranium flower and its leaves; but to my eyes, the contrast of the colours seen though the medium of the greater portion of the humours was as great as ever.'

Most later commentators, prompted by Dalton's remark about the red end of the spectrum being 'a shade, or defect of light' (see above), followed Thomas Young in supposing that it was the long-wave receptor that was missing in Dalton's case. This view – that Dalton was a protanope – was held by such distinguished figures as von Helmholtz, William Abney and W. D. Wright (Gordon Walls was an honourable exception.) Yet the contemporary accounts are clear that Dalton's spectrum was not foreshortened. And the colour confusions that he describes are as compatible with deuteranopia as they are with protanopia.

One of Dalton's eyes, preserved only in air between watch glasses, survived in the possession of the Manchester Literary and Philosophical Society; and in 1993 David Hunt, James Bowmaker and I were able to obtain permission to take a small sample from this eye for genetic analysis. In repeated amplifications, only one sequence could be found for an X-linked opsin gene – and it was the sequence of a gene for a *long-wave* pigment. Dalton was a deuteranope.

Contributed by **John Mollon**



The pink cranesbill,  
*Pelargonium zonale*.



A fragment of Dalton's eye

## Verriest Medal 2017: Professor David H. Foster



The ICVS Board of Directors is pleased to report that the 2017 Verriest Medal will be awarded to Professor David H. Foster at the 24th Biennial Symposium of the International Colour Vision Society, to be held in Erlangen, Germany from August 18-22, 2017. The award was established in 1991 in memory of the founder of the Society, Dr. Guy Verriest, and honors outstanding contributions in the field of color vision.

Professor Foster's distinguished career epitomizes the multidisciplinary nature of vision research. It began at Imperial College, London, where he studied physics and went on to do a Ph.D. in vision with W. D. Wright in the Applied Optics Section. He subsequently held posts at Imperial College (Department of Physics), Keele University (Department of Communication and Neuroscience), Aston University (Department of Vision Sciences), and the University of Manchester Institute of Science and Technology (Departments of Physics, Vision Sciences, and Optometry and Neuroscience). He is currently Professor of Vision Systems and Director of Research in the School of Electrical and Electronic Engineering at the University of Manchester.

He is a fellow of the Institute of Physics and the Optical Society of America.

Professor Foster's research has advanced our understanding of color vision for over 35 years. His studies of color constancy report landmark discoveries. The breadth of his contributions includes work on rod-cone interactions, color vision deficiency, color perception of natural scenes and hyperspectral imaging. In addition to his own research, he has tirelessly nurtured the entire field of visual science, most notably as a co-founder and longtime editor-in-chief of *Spatial Vision* and as an editor, senior editor and since 2013 the editor-in-chief of *Vision Research*.

The Directors are grateful to the members of the Verriest Medal selection committee for their considerations and recommendation: *Steve Shevell* (chair), *Rigmor Baraas*, *Marina Danilova*, *John Mollon*, *Jay Neitz*, *Hannab Smithson*, *Dora Ventura*, and *Françoise Viénot*.

*Contributed by Steve Buck*



ICVS 23<sup>rd</sup> Symposium Group photo: Sendai, Japan, 2015

# ICVS

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## TREASURER'S REPORT

*Neil Parry, PhD*

Financially the Society is in a healthy position, thanks partly to Keiji Uchikawa's careful stewardship of the Sendai meeting, resulting in a generous contribution to our coffers. The society's bank balance is £22860. As you know one of our main outputs is the provision of student travel awards, and we will as usual be offering several of these in support of the Erlangen meeting. Earlier this year we were able to donate £2000 to allow the recent ICVS summer school to provide 4 travel grants. I was delighted to have been involved in the Oxford meeting, and Sergio and Hannah can be congratulated on a making a success of this new venture. I have arranged for this issue of Daltoniana to be sent to all the summer school students, and I hope we have persuaded some, if not all, of them to join ICVS.

Everybody's current membership of the Society will expire at the end of December. Please take this as an early invitation to renew your membership at the beginning of 2017. Dingcai Cao and I plan to re-open the membership page on the website well before Christmas. The board have decided to retain the current fee structure, which is €140 for regular members and €30 for students and retired members.

I look forward to seeing old friends in Erlangen, and hopefully making some new ones.

## Editorial

*Dingcai Cao, PhD and Andrew J. Zele, PhD*

This is the 115<sup>th</sup> issue of Daltoniana since its first publication in January 1972, when edited by Guy Verriest up until its 64<sup>th</sup> Issue in September 1988. The next 51 issues were overseen by 5 Editors; John D. Moreland (Keele, UK) between October 1989 and March 1995, Harry G. Sperling (Boston, USA) between January 1986 (#86) and October 1997 (#89 is the only issue not available on the ICVS website) and Stephen J. Dain (Sydney, Australia) between April 1998 and May 2004 (#102). We are fortunate to have had the opportunity to edit Daltoniana since October 2005 (#103). We are grateful to the support during this time from Steve Buck (General Secretary) and Neil Parry (Treasurer). It is important for us to recognize Joel Pokorny, the immediate past president of the ICVS, for his mentoring.

We appreciate that John Mollon contributed a wonderful piece titled "the original Daltonian" to celebrate John Dalton's 250<sup>th</sup> birthday. We also congratulate David H. Foster on the award of the 2017 Verriest Medal. By all accounts, the ICVS Summer School in Oxford UK was a success. Finally, we are saddened that our long time friend and ICVS member, Professor Carlos de Lima Silveira, has left us forever.

All members are welcome to contribute to Daltoniana. All past issues can be accessed via [www.icvs.info](http://www.icvs.info) and they provide an historical record, along with the published proceedings of the Society, of many major advances in the field of colour vision.



# ICVS 2017

24th Symposium  
18 - 22 August

Erlangen - Germany



The conference website is launched <http://icvs2017.fau.de/> and will be regularly updated with details concerning abstract submission and registration deadlines, the scientific program and tours offered for the accompanying persons. Hotel reservations are also possible via the website. The website can redirect you to the Tourist office of Erlangen, where special rates for hotels have been negotiated for participants of the meeting.

## Traveling to Erlangen, Germany

**Arrival by airplane:** You can reach the Nuremberg (Nürnberg) Airport from all over the world. By car, it takes approx. 20 minutes from the airport to Universitätsklinikum Erlangen, or 45 min to an hour by train to Erlangen station. Other airports are Munich (München) and Frankfurt/Main and then the Intercity-Express (ICE) train to Nuremberg and further to Erlangen (see below)

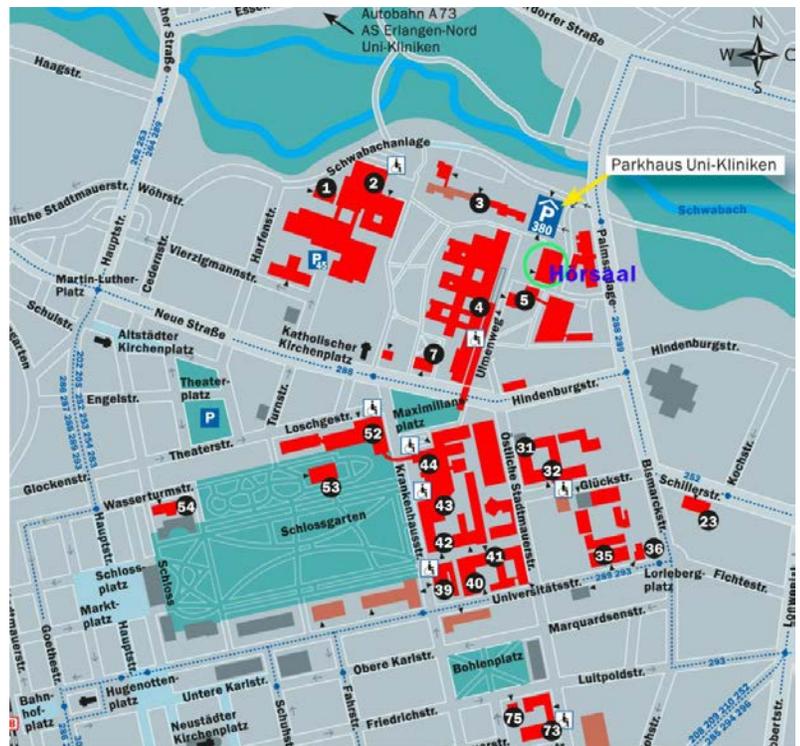
**Arrival by train:** The central station (“Hauptbahnhof” or “Hbf”) at Nuremberg is one of Germany’s most important railway intersections. It provides express train connections to all European metropolises every hour. Nuremberg Hbf to Erlangen takes approx. 20 minutes by regional train (RE), or approx. 25 minutes by the suburban railway train (S-bahn). Some ICE trains between Munich and Berlin stop in Erlangen. The university hospital is situated within walking distance to the station (approx. 15 minutes).

**Arrival by bus:** Bus connections to Erlangen are available from cities such as Cologne, Frankfurt, Munich and Stuttgart (see FlixBus).

**Arrival by car:** Outside Erlangen, Germany’s most important north-south- (A 9) and east-west-motorways (A 3, A 6) interlace. At the motorway (A 73) exit Erlangen-Nord, please follow the sign posts “Uni-Kliniken” to reach the establishments of the university hospital. We advise that you book a hotel with parking options, as on-street parking is limited in the area. There is a multi-story carpark next to the Hörsäle (“Parkhaus Uni-Kliniken” see map below, Schwabachanlage 14), which charges €0.50/half-hour, €5/day, or €35/week.



**Venue:** Hörsäle Medizin (Medical Lecture Auditorium), Ulmenweg 18, Erlangen (“Hörsaal” on the map below).





# ICVS 2017

Erlangen - Germany

24th Symposium  
18 - 22 August

## Call for papers

We invite you to submit an abstract for either a paper or a poster presentation on any aspect of colour vision. Topics of interest include, but are not restricted to, any of the following:

- Acquired loss of colour vision in retinal disease
- Central processing of colour signals
- Colour in occupational environments
- Colour induction and constancy
- Colour cognition
- Colour in the mesopic range
- Colour vision assessment
- Comparative colour vision
- Congenital colour vision deficiencies
- Ecology of colour vision
- Effects of ageing on colour vision
- Functional imaging and colour vision
- Genetics of colour vision
- Hypoxia and colour vision
- Isolation of chromatic mechanisms
- Object-surface properties, material perception, and related topics
- Peripheral chromatic sensitivity
- Physiology of colour vision
- Unique hues
- Variability in colour vision

Paper sessions will concentrate on the following topics:

- Electrophysiology of colour processing
- Cortical colour processing
- Clinical aspects of colour vision
- Presenting colour information on screens and monitors
- Phylogeny and ontogeny of colour vision
- Psychophysical aspects of colour vision

## ICVS 2017

### Local organising committee:

- Chair: Jan Kremers
- Tina Tsai
- Anneka Göppner
- Cord Huchzermeyer
- Edith Monczak
- Erlanger Tagungsbüro



### Scientific Organising Committee:

- Chair: Jan Kremers (University Hospital Erlangen, Germany)
- Barry Lee (State University of New York)
- Neil Parry (Manchester Royal Eye Hospital, UK)
- Rigmor Baraas (University College of Southeast Norway, Norway)
- Almut Kelber (Lund University, Sweden)
- Karl Gegenfurtner (University of Gießen, Germany)





# ICVS 2017

24th Symposium  
18 - 22 August

Erlangen - Germany

## Important Dates (subject to change)

- January 18th, 2017: Online registration, payment, abstract submission and application for travel award open
- April 1st, UTC+01:00, 2017: Final submission date of abstracts for papers and posters, and students travel award applications
- May 18th, 2017: Notification of presentation acceptances and student travel awards
- May 31st, 2017: End of early registration
- June 1st, 2017: End of hotel reservation (guarantee)
- June 30th, 2017: End of late registration
- July 18th, 2017: Final conference program on web
- August 1st, 2017: End of exceptional conference-only registration (includes admission to technical sessions, reception and lunch; excursion and banquet are not included).
- August 18 – 22, 2017: Symposium!

Registration fee is about 370 €. Students are eligible for discounts and grants.

The conference website (<http://icvs2017.fau.de/>) will be continuously updated. If you want to contact the organising committee please written an email to: [conference-icvs-2017@fau.de](mailto:conference-icvs-2017@fau.de)

## Special lectures and events

The Guy Verriest Medal will be awarded to Professor David H. Foster of the University of Manchester, UK.

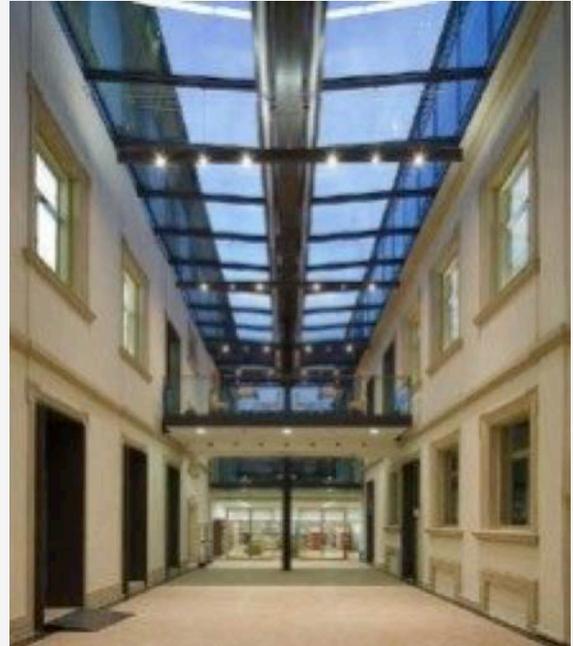
Invited speakers are:

- Austin Roorda (University of California, Berkeley)
- Kathy Mullen (McGill Vision Research Unit, Montreal)
- Robert Shapley (Center for Neural Science, New York University).

All invited speakers have confirmed their participation. We are looking forward to their contributions and to discussions with them.

## Social Program

Friday 18th August, 19:00 – 21:30: WELCOME RECEPTION at Palais Stutterheim (pictured below).



Monday 21st August, 12:30 – 18:30: ½ DAY EXCURSION in Franconian Switzerland, and 19:00 – 22:00: BANQUET dinner at Schloss Atzelsberg (pictured below).



An attractive program for accompanying persons has been worked out. Please refer to the conference website for details.

## Early-Career Member Profile: Tina I. Tsai, PhD



Tina in Erlangen

Tina grew up in Australia, and has an undergraduate background in Biomedical Science from The University of Melbourne. There, she met Prof. Algis Vingrys and Dr. Bang Bui, whose contagious enthusiasm piqued her interest in vision science. She was invited to first undertake an Honors research year with a Department of Optometry and Vision Sciences scholarship, and later a doctoral position supported by a Melbourne Research Scholarship under their supervision in the Visual Functions Laboratory. Her thesis examined the functional relationship between sequentially-activated cortical and retinal signals in the rat by isolating retinal processes with judicious control of the stimulus, intraocular pressure, and via drug-based approaches whilst simultaneously measuring the electroretinogram (ERG) and visual evoked potential (VEP). Her findings provided a set of ERG/VEP ‘signatures’ that allow the nature of visual inputs to be attributed to a specific retinal stream, and thereby allow better localization of the site of injury in the visual pathway. During her doctoral studies, she was granted an Overseas Research Exchange Scholarship from the University of Melbourne to undertake a 4 month

externship at the University of Freiburg, Germany, under the supervision of Prof. Michael Bach and Dr. Sven Heinrich. Through this project, she acquired the skills to assess retino-cortical signal transmission in human observers. Her experience there also cemented her wish to continue her research career in Germany.

In 2013, Tina moved to Munich, Germany, where she spent the year learning German and volunteering at the Institute for the Blind and visually handicapped. After visiting Prof. Jan Kremer’s lab at the University Eye Hospital in Erlangen, she was generously offered a Post-doctoral placement funded by the German Research Foundation. She joined his lab in 2014 and continued her specialization in ERG techniques. The main focus of her work there has been to establish the basic properties of photoreceptor signal processing in magno- and parvocellular pathways, and the on-/off sub-pathways. She hopes next to compare her observations of receptor-specific behaviours in normal observers to those with colour vision defects. On her other plate, Tina also works regularly on various genetically modified mice – such as the recently engineered M-opsin knock-out/human L-pigment knock-in LIAIS mouse. She has shown that the strain permits a more effective use of the silent substitution paradigm to study mouse photoreceptor properties, and propose that LIAIS-crossed disease models could enhance the comparison of pathophysiological changes between mouse and man.

Other highlights of her post-doctoral experience with Prof. Kremers so far has been their continuing collaborations with Prof. Dora Ventura’s group in São Paulo, and attending her first ICVS meeting in Sendai in 2015. Tina is part of the organizing committee of the 24<sup>th</sup> ICVS meeting in Erlangen, 2017.

### Select Publications:

1. Barboni MT, Martins CMG, Nagy BV, Tsai TI, Damico FM, da Costa MF, de Cassia Pavanello R, Lourenço N, Cerqueira A, Zatz M, Kremers J, Ventura DF. (2016) “Dystrophin is required for proper functioning of luminance and red-green cone opponent mechanisms in the human retina”, *Invest Ophthalmol Visual Sci* 57(8):3581-7. doi: 10.1167/iovs.16-19287
2. Martins CMG, Tsai TI, Barboni MT, da Costa MF, Nagy BV, Ventura DF, Kremers J. (2016) “The influence of stimulus size on Heterochromatic Modulation Electroretinograms”, *JOV*. 16(8):13, 1 – 11.
3. Tsai TI, Jacob MM, McKeefry D, Murray IJ, Parry NRA, Kremers J. (2016) “Spatial properties of L- and M-cone driven incremental (On-) and decremental (Off-) electroretinograms: evidence for the involvement of multiple post-receptoral mechanisms”, *J Opt Soc Am A* 2016. Mar; 33(3): A1 – A11.
4. Tsai TI, Atorf J, Neitz M, Neitz J, Kremers J. (2015) “Rod- and cone-driven responses in mice expressing human L-Cone pigment”, *J Neurophysiol*. Oct; 114(4):2230 – 41.

## Obituary: Professor Carlos de Lima Silveira, PhD



*Luiz Carlos de Lima Silveira  
(1953-2016)*

Members of the Society will be saddened to hear that Luiz Carlos de Lima Silveira, Professor emeritus at the Federal University of Pará (UFPA), Belém, Brazil, died in São Paulo, Brazil, on July 10, 2016 after a long illness.

Luiz Carlos Silveira received his MD from the Federal University of Pará, in Belém and his graduate degrees in the Biophysics Institute of Rio de Janeiro (UFRJ) – MSc in 1980, PhD in 1985 under his mentor Eduardo Osvaldo Cruz. A major interest was comparative neurobiology of the visual system of higher mammals. These electrophysiological experiments were complemented by a postdoctoral period at Oxford University with Alan Cowey and Hugh Perry working on the primate retina.

After returning to Brazil in 1988 he developed a neuroscience lab in Belém, Pará, his home town. He left a thriving group of former students focused on morphological and electrophysiological investigation of the parallel pathways of the visual system of New World primates and of rodent Amazonian species. Later he founded a second laboratory dedicated to work on the impact of exposure to neurotoxic agents, and of neurodegenerative genetic or metabolic diseases, on human vision, an area in which he worked in close collaboration with Dora Fix Ventura. He remained internationally active and collaborated with researchers around the world. He coauthored papers together with Barry Lee, Jan Kremers, Paul Martin and many others. He retired from the University in 2010 but maintained a strong commitment to vision research, and continuing working on data and manuscripts until recently.

He became active in the Society in the early 1990s, since his studies of the New- and Old-World primate visual systems were very relevant to the developing interest in the polymorphism of colour vision in New-world primates. He became a regular attendant at our meetings, and many of us will vividly remember the ICVS meeting in Belém in 2007 which he organized, especially the opportunity to see something of the Amazonian environment.

In recognition Luiz Carlos de Lima Silveira was elected member of the Brazilian Academy of Science and received from Brazil's president the title of Commander of the National Order of Scientific Merit. He also was honored with the title of Emeritus Professor at UFPA and received the Neuroscience Brazil Medal from the Brazilian Society of Neuroscience.

Luiz Carlos left his wife Regina and two children from his first marriage. Students and colleagues in Brazil, and his many friends throughout the world, will miss his ever-cheerful presence, the vivid discussions about politics and science, his humor and wit.

*Contributed by Dora Ventura, Jan Kremers and Barry Lee*

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### **Assessing the effects of dynamic luminance contrast noise masking on a color discrimination task**

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