DALTONIANA

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ICVS

Officers

2024 Verriest Medallist

The 2024 Verriest Medal will be awarded to Professor Karl R. Gegenfurtner at the 27th Symposium of the International Colour Vision Society to be held in Ljubljana, Slovenia, in 2024. The award was established in 1991 in memory of the founder of the Society, Dr. Guy Verriest, and honours outstanding contributions in the field of colour vision.

Professor Gegenfurtner's career in colour vision began with doctoral studies at New York University under the supervision of George Sperling and John Krauskopf, followed by a post-doctoral fellowship at NYU with Anthony Movshon, and then by appointments at the Max Planck Institute for Biological Cybernetics, Tübingen and Otto-von-Guericke University, Magdeburg. He took up his present position as Professor of Psychology at the Justus-Liebig-University Giessen in 2001.

His research contributions have ranged from low-level chromatic adaptation and discrimination, through colour constancy and higher-level cortical mechanisms, all the way to cognitive aspects such as colour memory, colour categorization, and colour in scene and object recognition. His work is centred on psychophysics, but he has embraced methodological innovations, using the power of deep neural networks and the immersive capabilities of virtual reality. His influential review articles have brought developments in colour vision to the larger community, and his laboratory in Giessen has provided a welcoming and productive environment for colour vision scientists from across the world.

Contents

27TH INTERNATIONAL COLOUR VISION SOCIETY MEETING

LJUBLJANA, SLOVENIA
JULY 5 – JULY 9, 2024

We are now only months away from welcoming you all in lovely Ljubljana for our 2024 ICVS meeting. I am pleased to say that we are well underway with preparations and our programme is already taking shape. The meeting will present opportunities for forming new connections between the fields of animal colour vision, clinical perspectives (both expertise of the University of Ljubljana) and all the other perspectives

on colour vision, represented in our society. We will discuss new research findings, as well as establish links between the different fields which we rarely get a chance to explore in parallel. I am happy to confirm the first three guest speakers who will be joining us in this exploration, Dr Deniz Dalkara (Vision Institute, Paris), Professor Tom Badden (University of Sussex), and Dr Jenny Bosten (University of Sussex). I would like to take the opportunity to thank the ICVS Officers and the Board of Directors, as well as the ICVS 2024 Organising and Scientific committees for working tirelessly on ensuring our time in Ljubljana will be enjoyable. As we know you are looking forward to our next opportunity to meet as much as I am, we will be launching our call for abstracts toward the end of 2023 (deadline March 19th, 2024), as well as sharing more information about the conference programme with you.

Kind regards,
Manca Tekavčič Pompe, on behalf of ICVS 2024 Organising Committee

Organising committee members

Manca Tekavčič Pompe, MD, PhD, Paediatric Ophthalmology, University Eye Clinic Ljubljana

Marko Hawlina, MD, PhD, Neuro-ophthalmology & Retinal dystrophies, University Eye Clinic, Ljubljana

Gregor Belušič, PhD, Animal physiology, University of Ljubljana

Maja Šuštar Habjan, PhD, Laboratory for visual electrodiagnostics, University Eye Clinic, Ljubljana

Andrej Meglič, PhD, Laboratory for visual electrodiagnostics, University Eye Clinic, Ljubljana

Nika Vrabič, MD, University Eye Clinic, Ljubljana

Ana Rozman, PhD, School of Psychology, University of Sussex

Scientific committee members

Jasna Martinovic, PhD, University of Edinburgh, UK

Marina Danilova, PhD, University of Cambridge, UK

Manca Tekavčič Pompe, MD, PhD, University Eye Clinic, Ljubljana, Slovenia

Gregor Belušič, PhD, Animal physiology, University of Ljubljana, Slovenia

Sérgio Nascimento, PhD, University of Minho, Portugal

Neil Parry, PhD, Manchester Royal Eye Hospital, UK

ICVS Treasury Report

I presented an interim budget to the membership at the Business Meeting in Crete, predicting a 2023 year end closing balance of £27496 less the cost of the summer school. We are in fact about £1000 better off than that. Most outstanding items have now been completed so I can provide you with an up-to-date account.

Income

The society's income derives largely from your subscriptions. Membership revenue is down from the 2019-2021 cycle, largely because of Covid and its impact on meeting attendance. The other main source of income is from the meeting surplus.

Expenditure

Our main expenditures are on student grants, the meeting proceedings, the website, the Verriest medal and the summer school. We bought a stock of blank medals a few years ago when the die was manufactured by Bigbury mint, so the only recurrent cost right now is posting it to the mint and having it engraved. We also support the travel and accommodation costs of the Verriest medallist if the meeting cannot do so. In this case, the costs came from the meeting budget. Student grants were in part covered by the meeting (in the form of 50% registration discount), whilst the Treasury provided support for the travel costs for the students coming from further afield, and for the prizes awarded to the best poster and talk given by a travel awardee. The other student prizes were provided by Optica (included in the meeting budget) and the Colour Group (GB), funded directly by them. In the intervening year we undertake to support the summer school, and this year committed to providing up to £5000 to cover student grants and other operating costs. The statement from Pembroke college has yet to be finalised, but I anticipate that our contribution will in fact be about £3500, of which we have already contributed £819.

Here is a summary statement for the current membership cycle (1/1/22 to 31/12/23). This covers both our bank account and our paypal account. I also show a summary of the virtual sub-accounts set up for the Crete meeting and the Summer School. These are for items that were handled by the treasury for these two meetings.

Opening balance 1/1/22	**22211.50**
Debtors 1/1/22[1]	2081.63
Income to date	
Subscriptions	7796.69
Meeting surplus (see below[2])	2191.18
Test payment to paypal	0.52
Total income to date	**9988.39**
Expenditure to date	
Domain	(34.18)
Web Hosting	(158.19)
Gifts	(236.10)
Medal postage	(7.65)
Medal engraving	(34.68)
Crete Proceedings	(1916.81)
Crete travel grants	(3001.97)
Travel awardee prizes	(400.00)
PP charge (to refund membership)	(13.83)
Summer School Support (see below[3])	(819.21)
Total expenditure to date	**(6622.62)**
Balance as at 29/9/23	**27658.90**

Treasury Report, continued from Page 3

To end of year	
Web Hosting	(25.17)
Summer School balance (estimated)	(2680.00)
Estimated balance at year end	**24953.73**

[1]*The debtor at start of 2022 was the Crete meeting as the treasury had already paid for Oxford Abstracts and the deposit on the conference hotel, since at that stage the meeting account had no income.*

[2]ICVS CRETE 22 SUB-ACCOUNT SUMMARY

Opening balance	**0.00**
Credit	
Sponsors	1781.00
Meeting balance sheet	6209.90
Total Credit	**7990.90**
Debit	
Submission portal	1200.00
Venue deposits	2191.18
Excursion deposit	273.91
Optica prize	150.00
Covid refunds	1984.63
Total Expenditure	**5799.72**
Surplus to treasury	**2191.18**

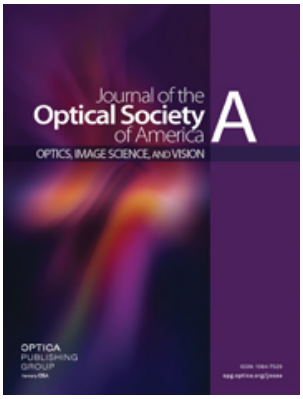
[3]ICVS SUMMER SCHOOL 23 SUB-ACCOUNT SUMMARY

Opening balance	**0.00**
Credit	
Sponsorship	4121.41
Total income	**4121.41**
Debit	
Forms software	(49.00)
Test registration[4]	(400.00)
Consumables	(33.02)
Catering	(661.61)
Student grants	(3796.99)
Total expenditure	**(4940.62)**
Balance at 29/9/23	**(819.21)**

[4]*To test the integration of our registration form and Stripe, the treasury 'registered' for the summer school using a discount code. Thus this was effectively just a transfer of funds from one account to the other with no cost to either party.*

Neil Parry, ICVS treasurer

JOSA A, 2025 Color Vision Feature Issue



Submission Opens: 15 July 2024

Submission Deadline: 15 October 2024

This feature issue will span basic-science and applied approaches to the study of color vision, including perception and psychophysics, physiology and anatomy, functional imaging, genetics, and color-vision deficiencies. The issue is intended to attract submissions based on presentations at the 2024 Symposium of the International Colour Vision Society (ICVS) to be held in Ljubljana, Slovenia, July 5-9, 2024 (https://www.icvs2024.com/). While meeting participants are particularly encouraged to submit their work, the feature issue is open to all other researchers in related areas.

All papers need to present original, previously unpublished work, and will be subject to the normal standards and peer-review process of the journal. To be eligible for publication, the paper needs to be expanded, revised, and/or refined to add value to the original conference summary. See Optica Publishing Group's policy on expanded conference papers here.

Manuscripts must be prepared according to the usual guidelines for submission to JOSA A and must be submitted through the Prism submission system. When submitting, authors should specify that the manuscript is for the "Color Vision 2025" feature issue (choose from the drop-down menu).

Feature Editors

Sérgio Nascimento, *University of Minho, Portugal* (Lead Editor)

David Foster, *The University of Manchester, UK*

Paul Martin, *The University of Sydney, Australia*

Yoko Mizokami, *Chiba University, Japan*

Maureen Neitz, *University of Washington, USA*

Galina Paramei, *Liverpool Hope University, UK*

Neil Parry, *The University of Manchester, UK*

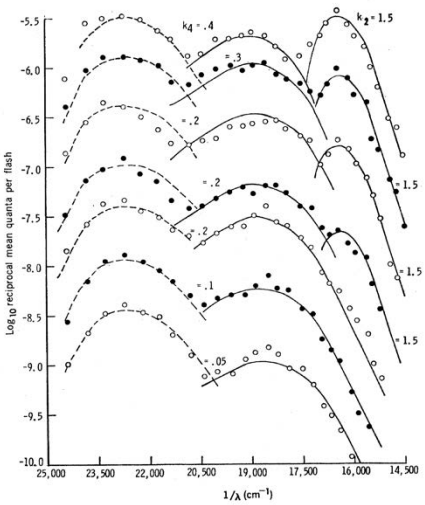
Manca Pompe, *University of Ljubljana, Slovenia*

Harry G. Sperling (1924 – 2023)

We are saddened to report the passing of Harry G. Sperling (age 98) the first Verriest medalist, awarded at the IRGCVD/AIC meeting in Sydney, Australia in 1991.

Harry received an A.B. from the University of Pennsylvania in 1944. He subsequently worked under Solomon Asch at The New School for Social Research where he received an M.A. in 1946. His Ph.D. was awarded in Experimental Psychology from Columbia University in 1953 under the tutelage of Clarence Graham.

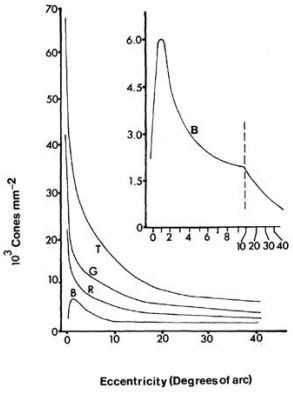
Harry served as an Experimental Psychologist from 1948 to 1959 at the US Navy Submarine Medical Research Laboratory in New London, Connecticut. There, he collaborated with Dean Farnsworth on classification of colour vision deficiencies. From 1959-1967 he was employed at Honeywell Federal Sciences in Minneapolis, MN where he worked on operant conditioning procedues to measure spectral sensitivity in rhesus monkeys (Sidley *et al*., 1965, *Science).*



From1967- 1994, Harry was professor at the University of Texas Medical Center in Houston, where he was the founding director of the Sensory Sciences Center. He had a number of students who worked on early stage mechanisms of primate colour vision, and who became distinguished in their own right. With Ron Harwerth, increment thresholds were measured in *Macaca mulatta* on a broad-band (5500°) background of high luminance presented in Maxwellian view. The figure on the left from Harwerth and Sperling (*Science*, 1971) shows one example. Whilst the short-wave lobe can be accounted for by the action spectrum of S-cones, the middle and long-wave lobes are too narrow to be explained by M- and L-cones or an additive combination; instead, the data require subtractive interactions between these cone types. Spectral sensitivity functions displaced downward in the figure show increasing intensities of a 650-nm addend to the adapting field. The long-wave branch shows reduced sensitivity without a shape change until the highest intensity at which it is no longer in evidence, and the middle-wave branch now resembles the action spectrum of M-cones. This was one of the earliest demonstrations of cone-opponent interactions at threshold. Increment thresholds under these conditions were also measured in an atypical subject who exhibited an exaggerated loss of sensitivity near 575 nm (Sperling, Piantanida & Garrett, *Colour Vision Deficiencies III*, 1976).

In a subsequent series of experiments, Harwerth and Sperling (1971) demonstrated changes in sensitivity functions after exposure to intense short- or middle-wave lights. Following short-wave (463 nm) exposure, there was a permanent loss in short-wave sensitivity, but following middle-wave (510 nm) exposure there was a loss in sensitivity (resembling congenital deuteranopia) that gradually recovered over 30 days. This is consistent with the conclusion that S-cones are more vulnerable to light damage than M- and L-cones.

With another graduate student, Robert Marc, Sperling measured the distribution of cone photoreceptors in baboon retina (Marc and Sperling, *Science*, 1977). This was accomplished by measuring light-stimulated increases in the reduction of nitroblue tetrazolium chloride in excised retinae. Wavelengths of stimulation were based on peak sensitivities of S-, M- and L-cone absorption spectra. Results, shown on the right, indicated, consistent with human psychophysics, that the number of cones for L>M> S, and the distribution of S-cones declined near the foveola as made clearer by the inset, unlike the distribution of M- and L-cones. Moreover, in the periphery, S-cones were distributed regularly, but the distribution of M- and L-cones was random.



These publications contributed to the S-cone *Zeitgeist* of the 1970's and 80's. Harry had a keen interest in retinal models of colour vision and the unique anatomical and psychophysical characteristics of S-cones. The photo below shows him in 1977 at a 'Working Party on the Blue Mechanism', held in Cambridge, England.

Front row, left to right: E. Pugh, F. Campbell, W.A.H. Rushton, W.S. Stiles, E.N. Willmer, H. Sperling, P. Gouras

Back row, left to right: H. Barlow, J.D. ,Mollon, P.G. Polden, D.I.A. MacLeod, M. Alpern, J. Krauskopf, P. Whittle, D. van Norren

(*Photo courtesy of J.D. Mollon*)

Harry Sperling was known in the early days of our Society as a leader in the understanding of retinal mechanisms of primate colour vision. He was supportive of his students, active in our Society, and a major asset at the meetings.

J.S. Werner

Recent Publications on Colour Vision

(not including JOSA A 2023 feature issue)

Chauhan, T. Jakovlje, I. , Lindsay, N., Thompson N., Wuerger, S.M. & Martinovic, J. (2023) Decoding of EEG signals reveals non-uniformities in the neural geometry of colour. *NeuroImage, 268,* 119884 https://www.sciencedirect.com/science/article/pii/S1053811923000332

Del Viva, M. M., Mariani, I., De Caro, C. & Paramei, G. V. (2022) Florence "blues" are clothed in triple basic terms. *i-Perception, 13*(5). https://doi.org/10.1177/20416695221124964

Hardy, J.I., Werner, J.S., Regier, T., Kay, P. & Frederick, C.M. (2023) Sunlight exposure cannot explain "grue" languages. *Scientific Reports.* https://doi.org/10.1038/s41598-023-28280-1

Higashi , H. & Okajima, K. (2023) Daylights with high melanopsin stimulation appear reddish in fovea and greenish in periphery. *Plos One.* https://doi.org/10.1371/journal.pone.0285053

Josserand, M., Meeussen, E., Majid, A. & Dediu, D. (2021) Environment and culture shape both the colour lexicon and the genetics of colour perception. *Scientific Reports, 11,* 19095. https://doi.org/10.1038/s41598-021-98550-3

Katra, E., Wooten, B.R. & Knoblauch, K. (2023) Perceived lightness/darkness and warmth/coolness in chromatic experience. 2023 doi:10.31234/osf.io/4k83w

Kim, Y.J., Packer, O., Pollreisz, A., Martin, P.R., Grünert, U. & Dacey, D.M. (2023) Comparative connectomics reveals noncanonical wiring for color vision in human foveal retina. *Proceedings of the National Academy of Sciences of the USA*, 120: e2300545120. 10.1073/pnas.2300545120

Knoblauch, K., Werner, J.S. & Webster, M. (2023) Warm and cool reheated. *Color Research & Application*. 1-4. doi:10.1002/col.22892

Martinovic, J., Huber, J., Boyanova, A. *et al.* (2023) Mirror symmetry and aging: The role of stimulus figurality and attention to colour. *Atten Percept Psychophys 85*, 99–112. https://link.springer.com/article/10.3758/s13414-022-02565-5

Mascio, A. A., Roman, A. J., Cideciyan, A. V., Sheplock, R., Wu, V., Garafalo, A. V., Sumaroka, A., Pirkle, S., Kohl, S., Wissinger, B., Jacobson, S. G. & Barbur, J. L. (2023) Color vision in blue cone monochromacy: Outcome measures for a clinical trial. *Transl Vis Sci Technol*. 12:25. DOI: 10.1167/tvst.12.1.25

Maule, J., Skelton, A. E. & Franklin, A. (2023) The development of color perception and cognition. *Annual Review of Psychology*, *74*, 87-111.

Pattie, C., Aston, S. & Jordan, G. (2023) Do EnChroma glasses improve performance on clinical tests for red-green color deficiencies? *Optics Express*, *30,* 31872-31888.

Rabin, J., Silva, F., Trevino, N. *et al.* (2022) Performance enhancement in color deficiency with color-correcting lenses. *Eye (Lond).* *36*(7):1502-1503. doi: 10.1038/s41433-021-01924-0

Shinomori, K., Barbur, J. & Werner, J.S. (2022) Aging of visual mechanisms. *Progress in Brain Research, Circadian and Visual Neuroscience, 273,* 257-273. https://doi.org/10.1016/bs.pbr.2022.04.012

Stockman, A. & Rider, A.T. (2023) Formulae for generating standard and individual human cone spectral sensitivities. *Color Res Appl*. 1-23. doi:10.1002/col.22879

Wissinger, B., Baumann, B., Buena-Atienza, E. & Kohl, S. (2023) The landscape of submicroscopic structural variants at the OPN1LW/OPN1MW gene cluster on Xq28 underlying blue cone monochromacy. *Proceedings of the National Academy of Sciences of the USA*,, *119*, e2115538119 https://doi.org/10.1073/pnas.211553811

Publications Translated *from English*

From J.D. Mollon & L.R. Cavonius (2012) The Lagerlunda collision and the introduction of color vision testing. *Documenta Ophthalmologica, 57,* 178-194.

by Kassia St Clair, *The Secret Lives of Color,* originally published in 2017 by Penguin Books,
Claudia Durastanti (Italian Translator)

From J.S. Werner & L.M. Chalupa, L.M. (Eds.) originally published in 2014, *The New Visual Neurosciences.* Cambridge, MA: MIT Press. [pp. 1675] [Mandarin Translation by People's Medical Publishing House, Beijing, 2022.]

112 chapters of which 18 are devoted to retinal mechanisms and pathways, 9 to primary visual cortex and receptive fields, and 9 to brightness and colour.