



International Commission on Illumination  
Commission Internationale de l'Eclairage  
Internationale Beleuchtungskommission



## CIE Tutorial on S 026

### Use and Application of the New Metrology for ipRGC-Influenced Responses to Light

*“Methods and principles to define light for responses beyond vision”*

*March 14 - 15, 2019, High Tech Campus 48, Eindhoven, The Netherlands*

## PRESENTERS

Luc Schlangen received his PhD from Wageningen University in 1995, after which he joined Philips Research Laboratories Eindhoven. His initial work focused on material science for displays, E-paper and skin care. In 2005 he joined the Philips Lighting headquarters to work on: (i) visual and non-visual responses to light, (ii) their impact on human health, performance and well-being, (iii) how to translate these responses into innovative lighting applications and strategies in health/elderly care, education, homes and workplaces. He is currently working in the Signify Lighting Applications research group and actively contributing to various standardization activities within CEN, DIN, CIE and ISO. He is the Dutch representative of CIE Division 6 “Photobiology and Photochemistry” and chair of CIE JTC9 who prepared S 026. He has been elected Director of CIE Division 6, starting June 2019.



Robert Lucas received his PhD in circadian biology in 1996. He has worked in the field of melanopsin photoreception since its inception and made seminal discoveries on the function and physiology of these new photoreceptors. Lucas chaired the International Workshop on Light Measurement and Manipulation for Non-Visual Light Responses in Manchester 2013 whose conclusions form the basis of S 026 and his studies of melanopsin spectral sensitivity in mice and humans provide scientific underpinning of its recommendations.



Manuel Spitschan (Department of Experimental Psychology, University of Oxford) read psychology at the University of St Andrews and completed his PhD at the University of Pennsylvania. After a short post-doctoral fellowship at Stanford University/VA Palo Alto, he joined the University of Oxford as a Sir Henry Wellcome Postdoctoral Fellow in September 2017, and was appointed Biomedical Sciences Junior Research Fellow at Linacre College in October 2017. Dr Spitschan is Chair of the Colour Technical Group within the OSA and served on CIE JTC9. His research focuses on the role of melanopsin-containing retinal ganglion cells in human visual and non-visual function.





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## PRESENTERS continued

Kenneth P. Wright Jr., PhD, is Professor in the Department of Integrative Physiology and Director of the Sleep and Chronobiology Laboratory at the University of Colorado Boulder. He has over 25 years of experience in the sleep and circadian fields, has led individual and multicentre/team research grants and has participated in multicentre clinical trials. His research is aimed at explaining the physiology of sleep and circadian rhythms in humans, understanding the health and safety consequences of sleep and circadian disruption, and applying that knowledge and sleep and circadian based countermeasures to improve public health and safety; including development of circadian based/light treatment strategies to improve sleep and circadian health. Prof Wright is committed to training the next generation of leaders in the sleep and circadian field. He maintains a large undergraduate, graduate and postgraduate training program in sleep and circadian physiology at University of Colorado Boulder. He has published over 100 peer-reviewed manuscripts and is a frequent reviewer for national and international grant agencies and journals. He currently serves on the Board of Directors of the Sleep Research Society and is a member of the Governmental Affairs Committee of the Society for Research on Biological Rhythms. Prof Wright has served on the Sleep Disorders Research Advisory Board (SDRAB) of the National Institutes of Health (NIH) National Heart, Lung, and Blood Institute.



Marijke Gordijn studied Biology at the University of Groningen and received her doctor's degree from the department of Psychiatry of the University Medical Centre Groningen. Over the past 30 years, Marijke has been working in the field of 24h rhythms, light, sleep and wellbeing. Projects vary from fundamental knowledge on photoreceptors, circadian rhythms and sleep regulation, to interventions to optimize shift work, up to light therapy for mood disorders and circadian rhythm sleep disorders. She is currently founder/owner of Chrono@Work, a science based company in the field of chronobiology, and a guest researcher of the University of Groningen. Furthermore, she is co-founder of Chronotherapy Network Netherlands, head of the scientific board of the Dutch Sleep-Wake society and vice president of the Society for Light treatment and Biological Rhythms. She served as an advisor and member of several committees of the Health council of the Netherlands.



## PRESENTERS continued

Professor John O'Hagan heads the Laser and Optical Radiation Dosimetry Group at Public Health England and is a Visiting Professor in Laser and Optical Radiation Safety at Loughborough University in the UK. He has been Director of CIE Division 6 "Photobiology and Photochemistry" since 2011 and has been elected to the role of CIE Vice-President Standards from June 2019.



He is active in standardisation work in ISO, IEC, CEN and CENELEC, is a member of the Scientific Expert Group of the International Commission on Non-Ionizing Radiation Protection (ICNIRP), and is a member of the Core Group of the World Health Organization, which is preparing basic safety standards for non-ionizing radiation protection.

Luke Price is a physicist working in the field of light and its benefits and risks for health. He is Secretary of CIE Division 6 on Photobiology and Photochemistry and serves on the editorial board of Lighting Research & Technology.



Luke introduced the concept of equivalent illuminances to express non-visual stimuli whilst acting as CIE Rapporteur to the 2013 international workshop "IWCNP", and was later the Secretary of Joint Technical Committee JTC-09 on quantifying non-visual photoreceptor stimulation, that has adopted equivalent illuminances in its international standard CIE S 026:2018, the subject matter of this expert tutorial. Working with two more JTC members in 2017, he contributed new wording to the 9th Edition of the SI Brochure being published in May 2019 to describe photobiological and photochemical quantities.

Marielle Aarts is an Assistant Professor light and lighting at the Eindhoven University of Technology, Department of the Built Environment. Her research field and expertise covers both the visual and the non-image forming effects of lighting but also on how to translate these insights into a the design for a sustainable future, considering both the user aspects as energy.



She has been working in this field for more than 25 years of which the last 17 years at the TU/e. She is chair of the Light and Health Research Foundation (SOLG, Stichting Onderzoek Licht en Gezondheid) and a founding member of the Daylight Academy.

## PRESENTERS continued

Peter Blattner has a doctorate in the field of Applied Optics from the University of Neuchâtel, Switzerland. He joined the Swiss Federal Institute of Metrology (METAS) in 2000, where he is currently the head of the optics laboratory. Since 2011 he has been the Director of CIE Division 2 (Physical Measurement of Light and Radiation), in this role he represents CIE at the Consultative Committees for Units (CCU) and for Photometry and Radiometry (CCPR). Furthermore, he is active in several standardization committees (ISO/TC169, IEC/TC 34, IEC/TC 76, CEN/TC 169) and chairs the Swiss Standardization Committee on light and lighting. In 2015 he received the CIE Wyszecki Gold Pin award for outstanding contribution in fundamental research. In October 2017 he was elected CIE President for the period 2019 to 2023.



Kamiel Spoelstra is a behavioural ecologist, and specializes in the impact of anthropogenic activity on ecosystems. In 2005 he completed his doctor's degree in circadian biology at the University of Groningen (NL), and continued with postdoc positions at Princeton University (2007), the Max Planck Institute for Ornithology (2009), the Netherlands Institute of Ecology (NIOO-KNAW, 2011) and Wageningen University (2017) and currently works as a researcher at the Netherlands Institute of Ecology. Kamiel currently studies the impact of light at night on the behaviour and physiology of species and how this ultimately affects populations. He is specifically interested in effects on spatial and temporal behaviour of nocturnal species. The scientific output of his work is frequently implemented and he has been closely involved in the establishment of the Eurobats guidelines for consideration of bats in lighting projects and the NSVV guidelines for public lighting in natural area.



Jan W. Denneman is Honorary Ambassador of the Global Lighting Association and founder of theGoodLightGroup, promoting Nutritional Light, focusing on the biological and emotional effects of light on people. Owner lighting innovation consultancy CarpeLucem. More than 40 years of experience in executive roles in innovation and business development. Skilled in Strategy, Innovation, R&D, Marketing, Business Management, Product Management, Sustainability, Standardisation, Government and Industry Relations. Leading innovation and marketing roles at Philips Lighting during the industry transition to LED and Intelligent Lighting Systems. Founded several international consortia, like the Global Lighting Association, Zhaga, the Connected Lighting Alliance, LightingEurope. President LightingEurope 2013-2017; President Global Lighting Association 2007 – 2017.

