

# SLEEP: THE FOURTH PILLAR OF HEALTH

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# SLEEP: THE FOURTH PILLAR OF HEALTH

October 18 and 19, 2018

## WELCOME

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Dear participants,

On behalf of the Organizing Committee, it is with great pleasure that we welcome you to the 'Sleep: the fourth pillar of health' B-DEBATE.

A balanced diet, moderate physical activity and emotional wellbeing are solidly established tenets for a healthy lifestyle in Western societies. However, an overwhelming body of scientific research supports the notion that quality sleep must be considered the fourth pillar of a healthy life. **Sleep is an essential part of a person's daily routine, enabling body and mind to recover and function optimally**, yet there is a lack of awareness of its importance among the population.

**An initiative of Biocat and "la Caixa" Foundation, this B-DEBATE is organized by the Global Observatory for Healthy Sleep, the Biomedical Research Institute of Lleida and AdSalutem Institute, and seeks to promote an open discussion between researchers, clinicians, social and cultural leaders and organizations, business and unions representatives, politicians and media, to raise awareness on the importance of quality sleep in health and disease. This B-DEBATE brings together world-renowned experts on key aspects of sleep and its societal impact in order to address pressing questions on sleep research and its impact on society. These include the use of big data and wearable technologies in sleep research, monitoring and policy making, the emerging role of informed patients in diagnosis and decision making, the multifaceted impact of sleep in productivity and economics, the important role of sleep as a comorbid condition in multiple diseases and the importance of sleep in understudied and vulnerable populations, such as infants and the elderly. The debate will close with a summary session on "Sleep for healthy ageing" assessing how research, analysis, training and dissemination initiatives can be leveraged to effect sociopolitical changes on the perception of quality sleep and sleep-related disorders.**

We firmly believe that the contributions of speakers and attendees in this B-DEBATE will foster an interdisciplinary discussion around the nature of sleep and its multifaceted social impact, enriching our perception and stimulating a lasting dialogue around this central component of a healthy lifestyle.

Yours sincerely,

Ferran Barbé, Lluís de Lecea, Ivan Erill and B-DEBATE

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# PROGRAM

Thursday, October 18, 2018

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8:45 Registration

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9:00 **Welcome**  
Àngel Font, "la Caixa" Banking Foundation  
Núria Martí, Biocat  
Antoni Esteve, AdSalutem Institute  
Ferran Barbé, Biomedical Research Institute of Lleida

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9:30 **SESSION 1. Sleep and big data**  
Chairpeople: Jordi de Batlle (Biomedical Research Institute of Lleida, Lleida) and Ivan Erill (University of Maryland Baltimore County, USA)

**Implications of genetics and genomics information for understanding sleep**  
Simon Warby, Université de Montréal, Canada

**The Digital Future of Sleep: Building Motivation for Health in the Digital Age**  
Mark Aloia, National Jewish Health and Philips, Inc., USA

**Big data approach to sleep in the Catalanian population**  
Sandra Bertran, Biomedical Research Institute of Lleida and CIBERES, Lleida

**Big data solutions for healthy sleep**  
Holger Woehrle, Sleep and Ventilation Center Blaubeuren/Lung Center Ulm, Germany

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11:30 Coffee break and networking sponsored by **PHILIPS**

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12:00 **SESSION 2. Sleep: a public perspective**  
Chairpeople: Carmen Cabezas (Department of Health of Generalitat de Catalunya, Barcelona) and Joan Escarrabill (Hospital Clinic de Barcelona, Barcelona)


**Sleep Myths and Realities: Lessons from hunter-gatherers**  
Jerry Siegel, University of California, Los Angeles, USA

**Sleep effects of Climate Change**  
F. Javier Puertas, University Hospital Liege, Belgium

**Sleep Smart City**  
Carlos Egea, Araba University Hospital and Spanish Respiratory Society, Vitoria

**Impact of societal routines on sleep. The case of Catalan Hourly Reform**  
Salvador Cardús, Autonomous University of Barcelona, Cerdanyola del Vallès

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14:00 Lunch and poster session sponsored by 

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15:30 Session summaries

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16:00 **SESSION 3. Sleep economics**

Chairpeople: Antoni Esteve (AdSalutem Institute, Barcelona) and David Gozal (University of Missouri School of Medicine, USA)

**European regulations and road safety**

Joaquín Durán-Cantolla, BioAraba, OSI Araba University Hospital, Vitoria

**Impact on a global scale: the business of sleep**

Oliver Smith, Telefonica Alpha, Barcelona

**Sleep and work**

Manolis Kogevinas, Barcelona Institute for Global Health, Barcelona

**Sleep interventions as healthy productivity enhancers**

David Gozal, University of Missouri School of Medicine, USA

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18:00 Session summary

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18:30 End of the session

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## Friday, October 19, 2018

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8:45 Registration

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9:00 **SESSION 4. Sleep and disease**

Chairpeople: Ferran Barbé (Biomedical Research Institute of Lleida, Lleida) and Lluís de Lecea (Stanford University, USA)

**Sleep and Cardio-Metabolic Disease: Physiological and Clinical Interactions and Implications for Population Health**

Susan Redline, Harvard Medical School, Brigham and Women's Hospital, USA

**Old problems, new diseases**

Alex Iranzo, Hospital Clinic de Barcelona, Barcelona

**Sleep and Cancer**

Ramón Farré, University of Barcelona, Barcelona

**Personalized chronobiology: the future of Health Care**

María de los Ángeles Rol, University of Murcia, Murcia

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11:30 Coffee break and networking

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12:00 **SESSION 5. Sleep in vulnerable populations**

Chairpeople: Xavier Soler (University of California and GlaxoSmithKline (GSK), USA) and Rafael Pelayo (Stanford University, USA)

**Sleep in pregnancy and newborn**

María Luz Alonso-Álvarez, Hospital Universitario de Burgos, Burgos

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### Sleep in teenagers and young adults

Leila Kheirandish-Gozal, University of Missouri School of Medicine, USA

### Sleep and scholar performance

Oscar Sans, AdSalutem Institute and Sant Joan de Déu Children's Hospital, Barcelona

### Sleep in the Older Adult

Sonia Ancoli-Israel, University of California San Diego, USA

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14:00 Lunch and poster session

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15:30 Session summaries

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16:00

### SESSION 6. Summary session: Sleep for healthy ageing

Chairpeople: Manuel Sánchez de la Torre (University of Lleida and CIBERES, Lleida) and Marco Inzitari (Pere Virgili Health Park, Barcelona)

### Sleep disruption and cognitive impairment

Mary Morrell, Imperial College London and Royal Brompton Hospital, UK

### Defining healthy sleep and circadian rhythms

Jamie Zeitzer, Stanford University, USA

### Diet and sleep

Manolis Kogevinas, Barcelona Institute for Global Health, Barcelona

### Sleep and Performance in Elite Athletes

Scott Kutscher, Stanford University Medical Center, USA

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18:00 Final summary

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18:30 Closing remarks and farewell

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# SCIENTIFIC COMMITTEE



**Ferran Barbé Illa**, Chair of the Respiratory Department at Hospital Universitari Arnau de Vilanova and Biomedical Research Institute of Lleida, Lleida, Spain

Ferran Barbé received his degree in medicine in 1985 and his PhD in 1999 from the University of Barcelona (Barcelona, Spain). He followed a training program in respiratory medicine at the Hospital de Bellvitge (Barcelona, Spain). In 1992, he received the **Diplome D'Universite in Sleep Physiology from the University René Descartes (Paris, France)**. He was the Director of the Sleep Unit at the Son Dureta University Hospital (Palma de Mallorca, Spain) for 14 years. In 2005, he moved to Lleida (Spain) as Head of the Respiratory Department at the Arnau de Vilanova University Hospital and Professor of Respiratory Medicine at the University of Lleida. He achieved his European certification in sleep medicine in 2013. Since May 2014 he was the Scientific Director of the Biomedical Research Networking Center Consortium for Respiratory Diseases (CIBERES, Madrid, Spain).

**Ferran Barbé's work focuses on sleep apnoea and cardiovascular diseases.** His research aims to achieve a better understanding of the pathogenesis of the cardiovascular consequences for sleep apnoea patients, and to evaluate new diagnostic and therapeutic options in such patients.

Ferran Barbé has had 200 papers published in peer-reviewed journals; these papers have received over 6800 citations. His H-index is 43 and member of The Editorial Advisory board for Lancet Respiratory Medicine.



**Antoni Esteve**, Founder and Chairman at AdSalutem Institute (Sleep Medicine), Barcelona

Antoni Esteve is PhD in Pharmacy by University of Barcelona.

He is Founder and Chairman at AdSalutem Institute (Sleep Medicine), an open, innovative and enterprising organization devoted to the promotion of Healthy Sleep for maintaining good health in society and recovering from illness. Added to that he is president at Esteve Teijin Healthcare, a joint venture dedicated to the home respiratory treatments that aims to ensure access to innovation to their customers, governments, health professionals, and above all, patients. He is also vice president at Farmaindustria: National Trade Association of the Spanish based pharmaceutical industry; and President of Fundació Catalana per a la Recerca i la Innovació: a non-profit organization founded in 1986 that act as an expert agent bridging the communication gap between those who generate knowledge and society at large. Added to that, he is numerary member of the Royal Academies of Pharmacy, Medicine and Doctors. Besides, he is former president at Laboratorios Esteve and former Manager Director at Laboratorios Esteve.



**Lluís de Lecea**, Professor at Stanford University, Stanford, USA

Prof. de Lecea is Director of Major Research Laboratory and Incubator and Professor at the Department of Psychiatry and Behavioral Sciences, Stanford University School of Medicine.

Dr. de Lecea obtained his PhD the University of Barcelona and conducted postdoctoral studies at The Scripps Research Institute in La Jolla, California. He was promoted to Assistant and Associate Professor at Scripps, and in 2006 he moved to Stanford University. **Dr. de Lecea's research is based on his discovery of three neurotransmitters that affect cortical activity and arousal. Dr de Lecea's work has had a high impact in the sleep field with over 24,000 citations, and led to the development of multiple drugs for the treatment of sleep disorders; one of which was recently approved by the FDA and several in Phase III trials. His laboratory also pioneered the implementation of optogenetic methods in vivo to manipulate neuronal activity in genetically defined neuronal circuits and alter behavior.**

Prof. de Lecea has received numerous awards, including Brain Research Foundation Distinguished Scientist Award, American College of Neuropsychopharmacology Innovation Award, and the Sleep Research Society Outstanding Research Achievement award. He serves on the editorial board of multiple journals and on multiple national and international committees including National Institute of Drug Abuse Board of Scientific Counselors.



Ivan Erill, Associate Professor at University of Maryland Baltimore County, Baltimore, USA

Originally trained as a computer scientist, Ivan Erill is currently an associate professor in bioinformatics at the University of Maryland Baltimore County. His research focuses on comparative genomics, machine learning, knowledge management and ontology development.



# DETAILED PROGRAM AND INVITED SPEAKERS

Thursday, October 18, 2018

## Session 1. Sleep and big data

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**Jordi de Batlle**, Senior Researcher at Biomedical Research Institute of Lleida, Lleida, Spain

Jordi de Batlle holds a PhD in Health and Life Sciences (Epidemiology) by the Pompeu Fabra University, Barcelona (Spain). Currently, he is a senior research fellow in the Group of Translational Research in Respiratory Medicine (TRRM), at the Biomedical Research Institute of Lleida (IRBLleida). In 2016, he assumed the co-leadership of the WP2 of the EU project CONNECARE (H2020). He is currently participating in several projects of the TRRM (ISAACC, BIG DATA, and ESCA, among others). Since 2016 he is benefiting a research contract from the Catalan government: Pla estratègic de recerca i innovació en salut 2016-2020 (PERIS-2016). During his career he has been granted two European Commission FP7 Marie Curie – COFUND grants. The first, to conduct a 2-year post-doc in the Nutritional Epidemiology section of the International Agency for Research on Cancer (IARC-WHO), Lyon, France (2012-2014), focusing on the relationship between vegetal nutrients and breast cancer, as well as the effects of meat products on colorectal cancer. The second, to conduct a 2-year post-doc in the TRRM group, focusing on the management of patients with suspected obstructive sleep apnoea in primary care units compared to sleep units. During his Ph.D. in the Centre for Environmental Epidemiology (CREAL) 2004-2011, he studied the measure and effect of diet in chronic obstructive pulmonary disease. His current research interests are on chronic respiratory diseases, sleep apnoea, nutritional epidemiology, community-based management of chronic diseases and big data. In this sense, he has authored more than 50 peer-reviewed research articles in international journals, including first authorship of articles in the most prestigious journals on the fields he has worked (Am J Respir Crit Care Med, J Natl Cancer Inst, Eur J Nutr, and Allergy).



**Ivan Erill**, Associate Professor at University of Maryland Baltimore County, Baltimore, USA

Read bio in page 8.

Chairs of session 1.

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**Simon Warby**, Assistant Professor at Université de Montréal, Montreal, Canada

Simon Warby is an Assistant Professor at the University of Montréal studying the genetics of sleep and sleep disorders. He is interested in understanding how sleep loss and disease can influence the activity of the brain, and how variations in the human genome modify this process. Important EEG microarchitectural features that appear during sleep, such as sleep spindles, are markers of healthy brain function and are linked to learning and memory. His lab develops informatic tools to quantitate sleep EEG features from large datasets in order to understand normal sleep, and identify physiological and genetic biomarkers useful for neurological, psychiatric, and sleep disorders.

Dr. Warby is the director of the Canadian Sleep Research Biobank, which facilitates the collection of biological materials such as blood, cells and DNA to enable genetic and biomarker studies within the Canadian Sleep and Circadian Network.

Current projects include REM-sleep behavior disorder, sleep disordered breathing and sleepwalking. One area of specific focus is the genetic basis of insomnia, which is closely linked to psychiatric diseases such as depression and anxiety.

In 2007, Dr Warby received a PhD for his work on the molecular and genetic aspects of Huntington disease with Dr Michael Hayden at the University of British Columbia. He conducted his Postdoctoral work on the quantitative analysis of EEG, and the identification of genetic factors that influence narcolepsy with Dr Emmanuel Mignot at Stanford University.

Dr. Warby has received numerous awards for his research, including a CIHR Banting Fellowship, a Brain and Behavior Research Foundation Young Investigator Grant, and Young Investigator Award from the Sleep Research Society. He is currently supported by the Canadian Institutes of Health Research, the Fonds de Recherche Santé Quebec, and the 'Chaire Pfizer, Bristol-Myers Squibb, SmithKline Beecham, Eli Lilly en psychopharmacologie de l'Université de Montréal'.

## Implications of genetics and genomics information for understanding sleep

Sleep is a dynamic process that is crucial for healthy functioning of the brain. The study of human genetics has made significant contributions to our understanding of sleep and sleep disorders. Many sleep traits and sleep disorders are heritable, and there is great interest in identifying the genes involved, as they provide insight on the molecular mechanisms of normal sleep and identify targets for the treatment of sleep disorders. In particular, electroencephalography (EEG) produces a rich and complex signal that contains a great deal of information about normal and abnormal brain function. During sleep, distinct brain activity patterns (EEG events), such as sleep spindles, slow-waves, and k-complexes are the result of interactions between several regions of the brain and comprise an EEG fingerprint. Our recent data suggests that components of the EEG exhibit both trait-like (stable over the lifespan, genetic) and state-like (influenced by the environment, drugs, age, etc) characteristics. Interrogating sleep traits and sleep disorders with human genetics will help us identify the genetic pathways and modifiers of brain activity during sleep, and better understand its role in health and disease.



**Mark Aloia**, Associate Professor of Medicine at National Jewish Health and Vice President & Global Lead for Behavior Change at Philips, Inc., Boulder, USA

Dr. Aloia is the Vice President and Global Lead for Behavior Change at Philips HealthTech and an Associate Professor of Medicine at National Jewish Health in Denver, CO. He has also been on the faculty at the University of Rochester and at Brown University as a prominent health researcher. Dr. Aloia has studied health behavior change for the past 20 years and maintains NIH funding through his academic work, with over \$15M in funding to study health behavior change. He serves as an NIH grant reviewer and has published over 50 scientific papers in high quality journals. Dr. Aloia has also served on the Editorial Boards of the journals *Sleep*, *Health Psychology*, and *Behavioral Sleep Medicine*. He has edited a book on *Behavioral Treatment for Sleep Disorders* that has been translated into multiple languages. He is a regular blogger on *Healthy Living* for the *Huffington Post*.

**Dr. Aloia's focus on behavioral methods to improve adherence to treatment has made significant contributions to the sleep and health psychology fields.** His studies include a strong focus on promoting positive health behaviors using theoretical models of behavior change and bringing theory into practice by incorporating these ideas into mobile applications and new sensor technology. His work at Philips has resulted in products and services that have demonstrated effects on health outcomes and help differentiate the company as a developer with empirically tested health outcomes.

## The Digital Future of Sleep: Building Motivation for Health in the Digital Age

There is no denying that the digital age has come and it has begun to involve a focus on health behaviors. More and more people are engaging in monitoring health behaviors, including sleep. But, are we optimizing the focus on digital monitoring and therapeutics in ways that can reduce costs, increase engagement and improve outcomes? We will discuss briefly the example of OSA and how industry and clinical partners can approach healthy sleep in the digital age. Changing from our traditional medical approach is not easy, but it may infect be the right thing to do to manage outrageous healthcare costs and poor engagement.



**Sandra Bertran**, Statistician at Biomedical Research Institute of Lleida (IRBLleida) and CIBERES, Lleida, Spain

Sandra Bertran is graduated in mathematics by the Universitat Autònoma de Barcelona (UAB) and she holds a Master's degree in Statistics and Operation research by Universitat Politècnica de Catalunya and Universitat de Barcelona. She is a statistician in the Group of Translational Research in Respiratory Medicine (TRRM) at the Biomedical Research Institute of Lleida (IRBLleida). She is currently working on the topics of sleep apnea, lung cancer and pulmonary diseases, in projects like ISAACC and Big Data, both of them targeting obstructive sleep apnea patients and focusing on the implications of CPAP treatment. In this sense, she has collaborated in several papers published in prestigious journals on the field (Am J Respir Crit Care Med, Chest and American Journal of Epidemiology). Her main statistical research interests are causal inference and Big Data based on the real world. In 2018 she has started a PhD on Causal Inference.

### Big data approach to sleep in the Catalan population

There are different phenotypes of obstructive sleep apnoea (OSA), many of which have not been characterised. Identification of these different phenotypes is important in defining prognosis and guiding the therapeutic strategy. A total of 72,217 CPAP-treated patients who contacted the Catalan Health System (CatSalut) during the years 2012 and 2013 were included. Six clusters were identified. The findings highlight the heterogeneity of CPAP-treated patients, and suggest that OSA is associated with a different prognosis in the clusters identified. These results suggest the need for a comprehensive and individualised approach to CPAP treatment of OSA.

Moreover, obstructive sleep apnea (OSA) has been associated with increased rates of morbidity and mortality due to its association with hypertension, cancer, and metabolic, cardiovascular and cerebrovascular diseases. The application of nocturnal continuous positive airway pressure (CPAP) effectively improves daytime symptoms and quality of life of OSA patients and moderately decreases arterial blood pressure in OSA patients with resistant hypertension. However, whether CPAP treatment reduces mortality at the population level remains unclear.

A total of 70,469 CPAP-treated patients and 184,112 controls matched (1:3) on 5-year age-group, gender and health region, attended by CatSalut during 2012-2013 were assessed to determine the relationship between CPAP treatment and mortality. Data on 2012-2013 comorbidities, and 2012-2015 mortality were recorded. The results suggest that the population of CPAP-treated patients in Catalonia had lower mortality rates than age-, gender- and region-matched controls, despite a higher prevalence of most comorbidities among CPAP-treated patients, that is, CPAP treatment is associated with reductions in mortality at the population level, although only in men. Therefore, further analyses should be planned within the frame of precision medicine<sup>6</sup> to clarify which OSA patients could benefit the most from CPAP treatment and whether CPAP might be detrimental in some specific patient subgroups.



**Holger Woehrle**, Medical Director and Co-owner at Sleep and Ventilation Center Blaubeuren/Lung Center Ulm, Ulm, Germany

- Specialist in respiratory and sleep medicine leading a large outpatient lung and sleep center.
- Largest center for telehealth in sleep in Germany with 5000 PAP-patients being connected with the center.
- Leader of the working group on digital pulmonology within the German Board of Pulmonologists.

### Big data solutions for healthy sleep

Digitization has led to access to various data and has given us the opportunity to analyze it. With different, especially mobile, technologies arising, the so-called "big data" has emerged. Big data refers to datasets that are too big, diverse and complex for data processing techniques that have been used in the past. With the development of machine learning, actionable/artificial intelligence guide decision making processes, also in medicine. First examples are skin lesions and pulmonary nodules. Also, self-management systems can be developed to optimize disease management, especially through the development of systems that engage the patient. While physicians have focused on developing systems for "crisis management" (predicting exacerbations of underlying disease), industry-driven approaches have been focused on stabilizing health/disease. Sleep medicine is currently the leading field for the use of mHealth/eHealth. Offerings vary from sophisticated sleep apps like SleepScore to online sleep self-management systems for patients with insomnia like Sleepio, while telemonitoring for sleep apnea currently represents the leading area of applied telehealth technology, with data of more than 1 billion nights already. Sleep medicine is just the first area where digitization takes place due to a lack of care

provided by most health systems, but other areas, especially Respiratory Medicine, will follow. It is time to change the current paradigm of medicine, where health care providers serve mainly as experts, to using modern technology (big data/machine learning/artificial intelligence) to improve decision making in healthcare while focusing on getting back to the original task of physicians by engaging and guiding patients during their journey through health and disease.

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## Session 2. Sleep: a public perspective

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**Carmen Cabezas-Peña**, Deputy Director for Health Promotion - Public Health Secretariat at Department of Health of Generalitat de Catalunya, Barcelona, Spain

Carmen Cabezas is the Deputy Director for Health Promotion of the Public Health Secretariat of the Department of Health of the Generalitat de Catalunya since April 2006.

She leads a team of 30 people who are actively engaged in promoting health and preventing non-communicable and vacunable diseases.

Dr. Cabezas graduated in Medicine (MD) from the University of Barcelona in 1982, and holds a Ph.D. from the University of Barcelona in 2016. She is a specialist in Family and Community Medicine (1988) and Public Health and Preventive Medicine (2003) and obtained a Masters in Health Sciences Methodology from the Autonomous University of Barcelona (1990). From 2001-2006 she was Head of the Unit of Research on Epidemiology and Primary Care of the Jordi Gol i Gurina Foundation- Catalan **Institute of Health**. **Previously, she was Medical Director of the Primary Care District of l'Hospitalet**. Catalan Institute of Health (ICS).

She currently is a member of the Board of the Master in Public Health at the Pompeu Fabra University and the Autonomous University of Barcelona.

Since 1987, she has extensive experience on research and teaching in health promotion and prevention. She is the author of more than 100 publications on the field of health promotion and prevention.

- **Joan Escarrabill**, Director of Chronic Care Program at Hospital Clinic de Barcelona, Barcelona, Spain

Chairs of session 2.

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**Jerry Siegel**, Professor at University of California, Los Angeles (UCLA), North Hills, USA

My research is focused on the phylogeny of sleep and on brain mechanisms controlling sleep. This has included studies of the brainstem control of REM sleep and studies identifying the role of monoaminergic and reticular neurons in sleep and motor control. In 2000 we, and others, reported that human narcolepsy was caused by a loss of hypocretin (orexin) cells in the hypothalamus, and we continue to investigate the function and role of this cell group. My current talk will be focused on sleep in human hunter-gatherers.

Recent publications can be viewed at: <http://www.semel.ucla.edu/sleepresearch/>

### Sleep Myths and Realities: Lessons from hunter-gatherers

How did humans sleep before the modern era? Because the tools to measure sleep were developed long after the invention of the electric light, television, the Internet and related devices that are suspected of delaying and reducing sleep, there is no reliable data on how sleep has changed from levels more characteristic of our species' evolutionary history. To address this question, we have investigated sleep in three traditional human societies. Despite their varying genetics, histories, and environments, we find that all three groups show similar sleep organization, suggesting that they express core human sleep patterns, probably characteristic of pre-modern era Homo sapiens. Group sleep periods averaged between 6.9 and 8.5 h, amounts at the low end of durations reported for healthy subjects in industrial societies, with a difference of nearly one hour between summer and winter sleep durations. Daily variation in sleep duration was strongly linked to the time of sleep onset, rather than the time of sleep offset. Although they lack electric lights, none of these groups began sleep near sunset, with sleep onset occurring, on average, 3.3 h after sunset. Furthermore, awakening was usually before sunrise. The sleep

period consistently occurred during the nighttime period of lowest environmental temperature, was not interrupted by extended periods of waking and terminated near the daily nadir of temperature. Light exposure was maximal in the morning and greatly decreased at noon, indicating that all three groups seek shade at midday. Napping occurred on less than 7% of days in winter and 22% of days in summer. Mimicking aspects of the natural environment experienced by these groups might be effective in treating certain modern sleep disorders.

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**F. Javier Puertas**, Chef de Clinique at Sleep Unit/Neurology Department, University Hospital Liege, Liege, Belgium

F. Javier PUERTAS, MD, PhD. (Alicante, Spain, 1968) is currently Chef de Clinique at Sleep Disorders Centre, Neurology Department, University Hospital of Liege, Belgium. Formerly he was the founder and head of Department of Clinical Neurophysiology and Sleep Medicine Centre at La Ribera University Hospital in Valencia, Spain (1999-2018), and assistant professor of Physiology at University of Valencia from 2001-2018. Graduated (MD) at Valencia University Medical School in 1993. Clinical Neurophysiology resident at La Fe University Hospital in Valencia, 1994-1997. Fellowship in Sleep Medicine at Sleep and Wake Disorders Center, Montpellier University Hospital, 1997-1998. Sleep and Wake Interuniversity Diploma, Montpellier University in 1998. Dr Puertas received his PhD degree in 2006. He has served as secretary of the Spanish Sleep Society from 2003 to 2006, and later as president, 2006-2010. He was appointed member of advisory board and scientific co-coordinator of Quality Standards of Sleep Units Document published by Spanish Health Ministry in 2011. Dr Puertas has published, 2 books, 15 book chapters, 40 research papers, and more than 100 abstracts. He has been involved in the organization of the first interdisciplinary accreditation course and examination in Sleep Medicine in Spain. Dr Puertas was certified as Somnologist, expert in Sleep Medicine, in the first examination for grandfathers organized by ESRS in 2012. In 2013, Dr Puertas was president of Local organizing Committee of World Sleep Medicine Congress in Valencia, Spain. Currently Dr Puertas serves as member of Sleep Medicine Committee of European Sleep Research Society and vice president of Spanish Sleep Society.

### Sleep effects of Climate Change

The effect of global warming and climate change on human health is a serious concern that is an important topic in the agenda of health authorities and the World Health Organization. The stress that fast changes of weather may produce in humans, beyond the natural disasters associated to this phenomenon, is a factor that challenges the psychological adaptation response and would increase the prevalence and incidence of insomnia and mental illness in coming years. The well known insomnia burden of industrial and urban societies will then be increased and extended widely. The effect of pollution associated to global warming and human industrial activity will increase the prevalence of respiratory diseases, as asthma, or destabilize the control of chronic comorbidities -heart diseases, chronic pain, etc- that will impair sleep quality.

The augmentation of average atmospheric temperature, especially during night time, and the effect of heat waves are important factors of disturbed sleep. Moreover, the temperature change and other natural catastrophes will stimulate the expansion of infectious diseases and vectors that can direct or indirectly damage sleep. For instance, the epidemic of influenza might be responsible in some studies of an increased incidence of narcolepsy. The potential effect on other viral or bacterial diseases in sleep/wake neurobiological mechanism is well known. Last but not least, the consequences of global warming and greenhouse effect on food production, water restriction and potential toxics in food chain would increase malnutrition diseases and deficit of some nutrients, as iron, that might be associated to restless legs syndrome.



**Carlos Egea**, Head of Sleep Department at Araba University Hospital and Director of Quality and Innovation at Spanish Respiratory Society (SEPAR), Vitoria-Gasteiz, Spain

Head of Sleep Department at Araba University Hospital and Director of Quality and Innovation at Spanish Respiratory Society (SEPAR). Member of Spanish Sleep Network and Gaudi Group Mechanical ventilation Founder.

Expert Européen SOMNONIV SPLF. Expert in Sleep Medicine (CEAMS). Master´s Degree in Management of Specialized medical services. Spanish Coordinator of Sleep, non-invasive mechanical ventilation and Respiratory Critical Care. SEPAR 2016-2018.

## Sleep Smart City

In research, it has also been clearly shown that sleep restriction is associated with immune, endocrine and vascular dysfunction. It is now well established that, on average, 10–35% of adults suffer from sleep loss during weekdays, sleeping less than 6h per 24h. Another determinant negatively affecting sleep is the use of mobile electronic devices (phones, computers) and the increasing amounts of leisure time spent on the internet. This activity affects many young adults, drastically reducing TST. Consistent with scientific results, men and women who decreased their sleep hours (< 6 horas) had a 2-fold higher risk of CVD mortality compared to men and women. Therefore, it seems to be important to increase the number of sleep time, for example, suggesting that a proper application of a short nap could positively affect the aforementioned functions. Thus, sleep is emerging as an essential component of a triad of healthy behaviors, which also includes healthy diet and physical activity. Sleep disorders with medical relevance have recently obtained attention in the EU health regulation ([http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2014.194.01.0010.01.ENG](http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.194.01.0010.01.ENG)); medical management and the prevention of their detrimental effects have been made mandatory. EU regulation considers all effects of sleep deprivation, but the issue that research has raised about poor sleeping remains underrepresented in the clinical practice. We need comprehensive strategies against the negative effects of sleep deprivation

For that reason, we propose the implementation of a wearable that monitors the amount of sleep of each citizen based on the information collected by different sensors (luminosity, movement, etc). This information will be transmitted to an app on each user's mobile phone, through which it will be forwarded to a self-learning platform designed exclusively for this project. This platform, which will be able to learn as it receives information from the users, and sent to them an individualized response in order to improve the time of sleep or not. One of the most important parts of this project will run out of Tecnalia, the Technology Center responsible for the design of the device, the machine learning platform, and the mobile app.

In addition, many other institutions at different levels will also be involved in the project: at the political level, the City Council of Vitoria-Gasteiz, Observatorio Global del Sueño and the Basque Government; at a scientific level, the Recerca de Lleida Institute, Bioaraba and the Sleep Units from OSI Araba, and Arnou Vilanova Hospital the core of the project; at the health level, Osakidetza and CATsalut as guarantor of health; and at the business level, companies that through sponsorship or patronage acts want to help achieve the project (Esteve Teijin, Linde Medica, Oxigen Salud, Philips, ResMed).



**Salvador Cardús**, Professor at Autonomous University of Barcelona, Cerdanyola del Vallés, Catalonia

Salvador Cardús i Ros (1954), PhD in Economics. Currently Professor of Epistemology and Sociology of Communication at the Universitat Autònoma de Barcelona. Invited as a Research Visiting at Cambridge University, Cornell University and Queen Mary College, London. Former Dean of the Faculty of Political Science and Sociology. He specializes in sociology of religion, immigration and identity and time organization, as a member of ISOR (Investigacions en Sociologia de la Religió, [www.isor.cat](http://www.isor.cat)).

Recently he works shaping a new paradigm to approach to the study of contemporary identity processes in order to understand the new challenges in a global and at same time fragmented societies. Usually, identity has been understood as a way to express what you are related to the others. But Cardús complete this idea understanding identity as a process to negotiate recognition but in order to avoid difficulties of self-definition. In other words, identity is a matter of making up, to hide, to naturalize as well to show.

He has published among others: *Plegar de viure* with Joan Estruch (1981), *Saber el temps* (1985), *La mirada del sociòleg* (2003), *El desconcert de l'educació* (2000), and *El camí de la independència* (2010) most of which in Catalan and Spanish editions. Professor Cardús is a regular contributor to the Barcelona daily press and a recognized lecturer in Catalonia and abroad. Member of the Institut d'Estudis Catalans (the Catalan Academy of Arts), he was member of the Council Adviser for the National Transition and currently member of the Council Adviser for the Time Reform both of Catalan Government.

### Impact of societal routines on sleep. The case of catalan Hourly Reform

It is obvious that every social organization determines the sleep habits of a particular society. Different countries, social classes, age or gender groups have different time structures, in close relation with their power within the social order. However, there is seldom aware of this relationship between time routines and a concrete social, economic and political status quo. Timetables are experienced as an expression of a fatality; they are not subject to critical reflection and, therefore, are not perceived as an instrument of submission or change. That is why the hour routines act as a factor of unconscious resistance to the positive change of the personal and social conditions of life.

This was the starting point that in 2013 allowed the convergence of fifteen expert professionals in various fields—medicine, schooling, labor, **entrepreneurship**, **health policies**...- of the time organization. They meet to propose a time reform that

allowed a critical reflection, an awareness raising and, finally, the change necessary to improve personal, but also organizational, conditions of Catalan society as a whole. Through an initiative initially not institutionalized dependence, a work plan was established that contemplated three phases: a) a scientific foundation; b) an awareness raising and c) a reform plan.

In a short space of time, the involvement of the Parliament and the Government of Catalonia was achieved, which allowed the elaboration of several reports that formed the basis of the situation in the public agenda of the timetable debate. In July 2015, the Government of Catalonia turned that initial team into Advisory Council for Hourly Reform. Pilot tests were promoted in various organizations, the commitment of local governments was sought and hundreds of meetings were held with the agents involved in a future hourly reform. Finally, after a long work of social consensus, in July 2017 the National Pact for the Time Reform was signed with final recommendations to promote the Hourly Reform that the Government promised to achieve in the 2025 horizon.

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## Session 3. Sleep economics

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**Antoni Esteve**, Founder and Chairman at AdSalutem Institute (Sleep Medicine), Barcelona, Spain

Read bio in page 7.



**David Gozal**, Chairman of Child Health at University of Missouri School of Medicine, Columbia, USA

Dr. Gozal is currently the Marie M. and Harry L. Smith Endowed Chair and the Chairmanship of the Department of Child Health at the University of Missouri, as well as Physician-in-Chief of the **University of Missouri Health Children's Hospital**. He received his M.D. from the Hebrew University of Jerusalem, and his MBA from Georgetown University and ESADE, completed his pediatric residency at the Haifa Medical Center in Israel, and then spent 2 years in Cameroon, West Africa, developing rural healthcare networks, for which he received the title of "Knight of the Order of Merit". He then completed his pediatric pulmonology and sleep medicine training at Children's Hospital Los Angeles in 1993, and joined the faculty at the University of Southern California and UCLA. In 1994, he moved to Tulane University, and was appointed tenured Professor and Constance Kaufman Endowed Chair in Pediatric Pulmonology Research. From 1999 till 2009, Dr. Gozal was at the **University of Louisville as the Children's Hospital Foundation Chair for Pediatric Research, Distinguished University Scholar, Director of the Kosair Children's Research Institute**, and Chief of the Division of Pediatric Sleep Medicine and the Sleep Medicine Fellowship Program, both of which were recognized as programs of distinction by the AASM. From 2009 till 2014, Dr. Gozal served as Chairman of the Department of Pediatrics and Physician-in-Chief and CEO of **Comer Children's Hospital at the University of Chicago**, and then assumed the position of Herbert T. Abelson Professor at the University of Chicago, where he also held the title of **Pritzker Scholar**. Dr Gozal's research interests encompass a wide spectrum of gene and cellular regulation in hypoxia and sleep disruption, genomic and proteomic biomarker and machine learning approaches to sleep apnea in both adults and children. He has published over 600 peer-reviewed original articles with a H index of 104 and >45,000 citations, 150 book chapters and reviews, and 3 books.

Chairs of session 3.

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**Joaquín Durán-Cantolla**, Chief of Research at OSI Araba University Hospital and Head of Araba Research Institute (BioAraba), Vitoria, Spain

Joaquín Durán-Cantolla (JDC) was born in Spain (1956) and obtained his MD degree in Cantabria University, Spain (1980). He trained and became board certified in Pulmonary Medicine by Valdecilla University Hospital and the Ministry of Health (Spain, 1985) and completed his academic Doctorate (PhD) in Medicine in 1991.

Between 1999 and 2011 he was head of the Sleep Unit at University Txagorritxu Hospital (Vitoria, Spain). From 2011 he is chief of Research of OSI Araba University Hospital and head of Araba Research Institute (BioAraba). JDC is Associated Professor of Medicine in the Basque Country University (Spain). He is a member of the CIBER of Respiratory Diseases funded by the Spanish Institute Carlos III. JDC has been certified as an Expert in Sleep Disorders by the Spanish Sleep Medicine Accreditation Board Committee (CEAMS). He is the director of Sleep Clinic of the Eduardo Anitua Clinic in Vitoria.

He has published 180 papers and is co-author of 31 books, has led 46 research projects, and authored 290 abstracts presented at National and International Conferences. He has been invited speaker at 680 scientific conferences and has won 16 research awards. He is co-inventor of several patents. He has been the president of the Spanish Sleep Group of the Spanish Respiratory Society from 2006 to 2009, and regularly serves as a reviewer in several specialty journals and is a senior consultant of sleep disorders.

His main field of research is the obstructive sleep apnea (OSA) and the topics of epidemiology, diagnosis, cardiovascular consequences and treatment of OSA.

### European regulations and road safety

*Abstract not available.*

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**Oliver Smith**, Strategy Director - Health Moonshot at Telefonica Alpha, Barcelona, Spain

Oliver is responsible for overall strategy within Telefonica Alpha's Health Moonshot, alongside establishing and maintaining strong partnerships, and business model development. He has extensive experience in strategy and innovation across a range of sectors. Before joining Alpha he was Director of Strategy and Innovation at Guy's and St Thomas' Charity, responsible for investing £100m over five years in innovations across acute, primary, and integrated care, and biomedical research and digital health. He was a Senior Civil Servant in the UK Department of Health; responsible for UK Tobacco Control Policy, and wrote the government's first comprehensive childhood obesity strategy. Oliver was also a Policy Adviser in the Prime Minister's Strategy Unit under Tony Blair. He has a BA in Politics, Philosophy, and Economics from Oxford University.

### Impact on a global scale: the business of sleep

There are over 300,000 health apps available. But why is digital health still failing to deliver its promise? This presentation will describe the trends in the digital health market, look at some of the approaches being applied to create global business, and suggest a new approach that marries the best of science and design-thinking.

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**Manolis Kogevinas**, Professor at Barcelona Institute for Global Health (ISGlobal), Barcelona, Spain

Professor Manolis Kogevinas, MD, PhD is a senior researcher at the Barcelona Institute for Global Health (ISGlobal). He is currently on sabbatical at the School of Public Health, UW and the Fred Hutchinson Cancer Research Center, Seattle, WA, USA. He worked at IARC/WHO, Lyon, at IMIM, Barcelona, and was co-Director of the Centre for Research in Environmental Epidemiology (CREAL) in Barcelona, Spain. His research focuses on environmental, occupational and genetic factors in relation to cancer, respiratory diseases and child health. In recent years he has focused his research on the effects of circadian disruption on health. He has published more than 500 indexed scientific papers. He was President of the International Society for Environmental Epidemiology (ISEE) in 2016-2017.



## Sleep and work

About 10% to 15% of the working population does night shift work and in some major sectors, e.g. health, transport, this percentage is much higher. Night work has resulted to a massive disturbance of the normal sleep-wake rhythm. Numerous prospective and cross-sectional surveys have shown that night workers have a shorter duration of sleep than day workers and a higher prevalence of sleep problems and fatigue although the studies are not all consistent. Night workers have probably a higher risk of post-shift accidents and, in the long term, a higher risk of cardiometabolic disorders, obesity, type 2 diabetes and possibly cancer. I will discuss the evidence associating night work with acute and long-term health problems.

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**David Gozal**, Chairman of Child Health at University of Missouri School of Medicine, Columbia, USA

[Read bio in page 15.](#)

## Sleep interventions as healthy productivity enhancers

The talk will focus on the potential economic burden of insufficient or poor quality sleep in the context of modern society, and how targeted interventions in the workforce aimed at optimizing sleep or palliating to sleep deficits in the context of the job settings, may foster personal and team productivity along with maximizing well-being and harmonious inter-individual relationships.

Thus, sleep promoting initiatives that enhance biological homeostasis should be viewed as investments for enterprise success rather than sunk costs or missed opportunities.

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# Friday, October 19, 2018

## Session 4. Sleep and disease

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**Ferran Barbé Illa**, Chair of Respiratory Department at Hospital Universitari Arnau de Vilanova and Biomedical Research Institute of Lleida, Lleida, Spain

Read bio in page 7.



**Lluís de Lecea**, Professor at Stanford University, Stanford, USA

Read bio in page 7-8.

Chairs of session 4.

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**Susan Redline**, Professor of Medicine at Harvard Medical School, Brigham and Women's Hospital, Boston, USA

Susan Redline, MD, MPH, is the Peter C. Farrell Professor of Sleep Medicine at Harvard Medical School. She directs Programs in Sleep and Cardiovascular Medicine and Sleep Medicine Epidemiology at Brigham and Women's Hospital and Beth Israel Deaconess Medical Center. **Dr. Redline's research** includes epidemiological studies and clinical trials designed to 1) elucidate the etiologies of sleep disorders, including the role of genetic and early life developmental factors; and 2) understand the cardiovascular and other health outcomes of sleep disorders and the role of sleep interventions in improving health. She leads the Sleep Reading Center for a number of major NIH multicenter studies, including the Sleep Heart Health Study, and has led several large cohort studies, including **the Cleveland Children's Sleep and Health Study**. She has published over 500 peer-reviewed articles and has served the sleep research community in a number of capacities, including as a member of the Boards of Directors for the American Academy of Sleep Medicine and the Sleep Research Society, the NIH's Sleep Disorders Research Advisory Board, the Institute of Medicine's Committee on Sleep Medicine and Research, and Deputy Editor for the journal *Sleep*. She received BS and M.D. degrees from Boston University, an MPH degree from Harvard School of Public Health, completed internal medicine and pulmonary and critical care medicine training at Case Western Reserve University, and a research fellowship in Respiratory Epidemiology at Harvard Medical School.

### **Sleep and Cardio-Metabolic Disease: Physiological and Clinical Interactions and Implications for Population Health**

Healthy sleep is fundamental for cardio-metabolic health. In health, sleep-related changes in the autonomic nervous system (ANS) and neuro-humoral functions result in reductions in heart rate, blood pressure and cortisol. In contrast, disturbed sleep adversely affects acute and chronic cardiovascular functions through mechanisms that include blood pressure surges and vascular injury, increased cardiac oxygen demand and ischemia, and cardiac electrical instability, as well as by altering eating behaviors and metabolism, leading to obesity and metabolic dysfunction. There are multiple sleep-related stressors relevant for cardio-metabolic function: short sleep duration, poor sleep quality (insomnia), altered sleep architecture (reduced slow wave sleep) and variable sleep patterns, as well as circadian misalignment. Common sleep disorders- obstructive sleep apnea, insomnia, and periodic limb movements- also each pose specific cardio-metabolic stressors (such as hypoxemia). Sleep and cardio-metabolic diseases share common risk factors and are inter-related by causal and bi-directional pathways. This talk will review the range of sleep-related stresses as they relate to cardio-metabolic health; identify new biomarkers for sleep health/disturbance; and discuss the scientific and public health implications of sleep on cardio-metabolic health.

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**Alex Iranzo**, Neurologist at Hospital Clinic de Barcelona, Barcelona, Spain

Alex Iranzo, MD, PhD, graduated in Medicine (1991) and defended his PhD thesis (2002) at the Universidad de Barcelona, Spain. Presently, he is neurologist Consultant 2 of the Neurology Service, Research Coordinator of the Neuroscience Institute and Coordinator of the Multidisciplinary Sleep Unit at the Hospital Clinic of Barcelona, Barcelona, Spain.

He is associate Professor of the University of Barcelona of Medicine, and investigator of August Pi i Sunyer Biomedical Research Institute (IDIBAPS) and CIBERNED. He is Clinical Coordinator of AdSalutem Center of Sleep Medicine. He is President of the Spanish Sleep Society.

He is a member of numerous national and international societies such as the American Academy of Neurology, Movement Disorder Society, American Academy of Sleep, World Association of Sleep Medicine, European Sleep Society, International REM Sleep Behavior Disorder Group, European Restless Legs Syndrome Society, European Narcolepsy Network, Spanish Society of Neurology and Spanish Sleep Society.

Dr. Iranzo has widely published as first and corresponding author in peer reviewed journals such as The Lancet, The Lancet Neurology, Annals of Neurology, Neurology, Journal of Neurology Neurosurgery and Psychiatry, Movement Disorders, Sleep, and Sleep Medicine. Presently, he is at the editorial board of the journal Sleep Medicine.

### Old problems, new diseases

Common sleep complaints include insomnia, hypersomnia, snoring, changes in the wake-sleep pattern and abnormal behaviors during sleep. Abnormal behaviors during sleep may be simple or complex and usually correspond to well-defined conditions such as hypnic jerks, sleepwalking, night terrors, periodic leg movements in sleep and seizures. Recent evidence indicates that abnormal sleep behaviors can be the first manifestation of two neurological diseases, namely Parkinson disease and anti-igLON5 disease.

REM sleep behavior disorder is a parasomnia first formally described in 1986 that is characterized by dream-enacting behaviors (e.g., punching, gesturing, kicking, crying, shouting), nightmares and loss of muscle atonia in REM sleep. Follow-up of individuals with the idiopathic form of REM sleep behavior disorder shows that most of them eventually develop the classical signs and symptoms of Parkinson disease.

The anti-igLON5 disease was first described in 2014 by physicians from Hospital Clinic de Barcelona. Patients with this condition report abnormal complex sleep behaviors such as talking, gesturing and manipulating imaginary objects that occur during both REM and nonREM sleep. Besides, these patients display other neurological symptoms (e.g., gait problems, cognitive dysfunction) and sleep problems (obstructive sleep apnea, stridor, abnormal sleep architecture). The disease is mediated by antibodies against the neuronal cell surface protein igLON5, a tight HLA association, and the presence of neuronal loss and tau deposits in the hypothalamus and brainstem.



**Ramón Farré**, Professor of Physiology at University of Barcelona, Barcelona, Spain

Ramón Farré (RF) is Professor of Physiology at the Biophysics and Bioengineering Unit of the Faculty of Medicine and Health Sciences of the University of Barcelona (UB) since 2003. In the teaching field, he has been taking responsibilities of coordination in the Degrees of Medicine and Biomedical Engineering and in the Master of Bioengineering. In the field of university management, RF has been Secretary of the Department of Physiological Sciences I, Secretary and Vice-Dean of the Faculty of Medicine and member of the Delegate Economic Commission of the Governing Council of the UB. In the field of national scientific management, RF is Coordinator of the Area "Biopathology and respiratory, cardiovascular and renal bioengineering" of the Biomedical Research Institute of August Pi i Sunyer (IDIBAPS), is head of the research group "Respiratory biophysics and bioengineering" of the IDIBAPS, and head of Group 12 of the CIBER of Respiratory Diseases. At the international level, in the last 10 years RF has been "officer" of the "Clinical Respiratory Physiology, Exercise and Functional Imaging" Assembly of the European Respiratory Society, and has been a member of the strategic planning of the "Sleep and Respiratory Neurobiology" Assembly of the American Thoracic Society. Since 2008 he is Associate Editor of the European Respiratory Journal (1st decile ISI). Since the creation of EIT-Health (2015), RF is Director of Education of its Spanish node and is a member of the "Strategic Committee of Education" of EIT-Health (Munich, Germany). RF research is

located in the field of bioengineering. Specifically, it is aimed at deepening our understanding of the mechanical behavior of the respiratory system to improve the diagnosis and treatment of respiratory diseases. He has published 230 international peer-reviewed papers (h-index=40).

## Sleep and Cancer

The fact that cancer and its treatment negatively affect patient sleep is well known. However, whether sleep disturbances could enhance cancer development and progression is a question that has been raised more recently. There is, however, considerable evidence from epidemiological and clinical studies and from of experimental research in cell and animal models strongly suggesting that sleep alterations may increase the growth and metastasis of several types of malignancies. Different sleep disturbances can boost cancer growth. On the one hand, changes in sleep architecture, for instance modification of the circadian cycle by shift work or sleep fragmentation caused by sleep apnea). On the other hand, the events of chronic intermittent hypoxia experienced by patients with sleep apnea have also been shown to increase cancer progression. Current basic and clinical research is focused on identifying the pathophysiological mechanisms determining the interaction between sleep and cancer.



**María de los Ángeles Rol**, Lecturer in Physiology at Chronobiology Lab, University of Murcia (CIBERFES, IMIB-Arrixaca), Murcia, Spain

PhD (Universidad Complutense de Madrid) and Lecturer at the University of Murcia (Department of Physiology). My current research as CronoLab co-director is mainly focused on circadian rhythm impairment (or chronodisruption) with the aim of identifying its causes and minimizing its potential impact on health (as it is a risk factor for several life-threatening conditions).

The results of this research have been published in 90 peer-review articles, books and book chapters. I have collaborated in 38 research projects/contracts and, together with the rest of the CronoLab members, I have received 11 research awards in several congresses and foundations, as well as co-authored 3 patents and 6 Intellectual Property Registrations. I have founded two spin-off companies devoted to circadian consulting in humans: Chronobiotech S. L. (2010-2012) and Kronohealth S. L. (2017-). Currently, I participate in a CIBER consortium focused on healthy aging research, as well as in a campaign on social networks (SueñOn®) for improving sleep in hospital environments.

## Personalized chronobiology: the future of Health Care

Circadian system functioning can be impaired by exposure to inappropriate environmental cues and unhealthy behaviours, leading to chronodisruption (CD). This circadian alteration may play a central role in the expression and development of several diseases, such as cancer, hypertension, diabetes, insomnia, cognitive and affective disorders, immunosuppression and accelerated aging, among others. However, despite its importance, measuring CD is still an unresolved challenge, and thus, scientists are demanding objective tools to be able to quantify sleep and circadian function under free living conditions.

Basic human physiology monitoring under controlled conditions provides a huge amount of data that can be used to phenotype candidate circadian and sleep disruption biomarkers. This way, we can obtain new scorings to be used in clinical practice and also identify people who would benefit (or not) from a given intervention. Our innovative wearable devices and algorithms are designed to involve users in changing their life style in order to improve circadian robustness and, thereby, their health and well-being in a personalized way.

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## Session 5. Sleep in vulnerable populations

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**Xavier Soler**, Associate professor of Medicine at University of California San Diego and USMA Medical Expert at GlaxoSmithKline (GSK), San Diego, USA

Xavier Soler, MD, PhD, is an associate professor of medicine at University of California (UC) San Diego. He has recently joined GSK as an US medical affairs (USMA) physician-scientist/medical expert in respiratory. He specializes in pulmonology and sleep medicine and is the medical director of the pulmonary rehabilitation program and director of the Clinical Trials & Airway Research Center.

He specializes in the diagnosis, treatment and management of chronic lung diseases, including chronic obstructive pulmonary disease (COPD) and asthma.

Dr. Soler is actively involved in education at UC medical school, as well as a clinical researcher. Most of his original work focuses on sleep disorders affecting patients with COPD. He is current investigator for the NIH-funded networks from the American Lung Association (ALA-ACRN) and the COPDGene studies. Dr. Soler is involved in studying new asthma treatments, as well as a COPD phenotype initiative that includes genotyping and state-of-the-art imaging techniques. Dr. Soler has been awarded by the American Thoracic Society (ATS) for outstanding early career investigation and also for his research contributions to the pulmonary rehabilitation field. Also, he received the UC international mentorship award in 2017. He also is involved with several initiatives to increase knowledge among physicians in respiratory medicine using new technologies.

As an associate professor in the Department of Medicine, Dr. Soler teaches medical students, residents and pulmonary fellows. He is also a lecturer in national and international meetings and serves as a reviewer for several journals, including CHEST, European Respiratory Journal, Thorax, and American Journal of Respiratory and Critical Care Medicine, etc.

Prior to his arrival at UC San Diego Health in 2006, Dr. Soler served as co-director of the Pulmonary Rehabilitation Program and co-director of the Sleep Medicine Unit at Hospital Quirón Teknon in Barcelona. During his tenure there, he also directed the Tobacco Cessation Unit and the Department of Bronchology.



**Rafael Pelayo**, Clinical Professor at Stanford University, Stanford, USA

Rafael Pelayo, MD is a clinical professor at Stanford University School of Medicine in the division of Sleep Medicine. He graduated with a degree in Biology from the University of Puerto Rico. His initial exposure to sleep medicine was as a medical student at the Albert Einstein College of Medicine. That experience led him to decide to pursue a career in sleep medicine. As a pathway into sleep medicine he trained as a child neurologist. He joined the Stanford Sleep Disorders Clinic in 1993 and never

left. In 2013, he was appointed as a clinical professor at the Sleep Medicine division of the department of psychiatry. Dr. Pelayo's focus has been the treatment of sleep disorders in patients of all ages. He has lectured extensively and appears frequently in the media. He was recently elected president the California Sleep Society. He has served as chair of the Sleep Disorders Research Advisory Board of the National Center for Sleep Disorders Research at the National Heart Lung Blood Institute at the NIH. He has also chaired the pediatric special interest section of the American Academy of Sleep Medicine. Dr. Pelayo currently teaches the Stanford University Sleep and Dreams undergraduate course alongside Dr. William Dement. Together, they co-authored the course textbook.

Chairs of session 5.

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**María Luz Alonso-Alvarez**, Head of Sleep Unit at Hospital Universitario de Burgos, Burgos, Spain

M<sup>a</sup> Luz Alonso- Alvarez received her PhD in 2002 from the University of Valladolid (Valladolid, Spain). She followed a training program in Respiratory Medicine at Hospital General Yagüe (Burgos, Spain). She followed an educational stay in Sleep Medicine in 1998. She was Honor Professor Universidad of Valladolid from 2014. Member of research Net CIBERES Instituto de Salud Carlos III

**and Member of Spanish Sleep Network. Expert in Sleep Medicine (CEAMS). Dra. Alonso's research interests a wide spectrum of Sleep disordered breathing and sleep problems in both adults and in children. In recent years, her main research has focused on sleep disordered breathing in children. Dra. Alonso was coordinator of the National Consensus for the Diagnosis and Treatment of OSAS in children in Spain (ArchBronc, 2011), and member of the European Task Force for the management of children with sleep disordered breathing (ERJ 2016, 2017). Dra. Alonso has participated as an Expert**

Advisor in Guidelines on Sleep Disorders in Childhood and Adolescence in Primary Care, of the Ministry of Health Social Policy and Equality. She has published more than 100 international peer-reviewed papers.

## Sleep in pregnancy and newborn

Significant physiological changes occur in women during pregnancy. For most women, altered sleep is one of the physiologic changes occurring during pregnancy. But in order to assess these physiological changes, we need to know what constitutes Healthy Sleep in each trimester of pregnancy, therefore, it is necessary to consider Sleep as a Pillar of Health and to assess the potential benefits of a Healthy Sleep.

Another important aspect to consider is how sleep disturbances during pregnancy affect the status health of the pregnant woman and the child. In 2000, the American Academy of Sleep Medicine recognized sleep disorders associated with pregnancy as a separate entity defined as the occurrence of insomnia or excessive daytime sleepiness in the course of pregnancy.

Sleep is essential for optimal health in children, is essential for healthy cognitive, psychosocial and physical health. Normal sleep in infancy is a physiological state with changes in brain activity. Sleep – wake regulation architecture, total sleep time and sleep staging evolve rapidly during the first year of life, with continued maturation across childhood. Although the ideal amount of sleep changes with age, recommendations about the duration of sleep are important, since the duration of sleep is related to a broad set of health indicators in children aged 0-4 years. Sleeping the number of recommended hours is associated with better health outcomes.

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• [Leila Kheirandish-Gozal](#), Professor of Pediatrics and Director of the Child Health Research Institute (CHRI) at University of Missouri School of Medicine, Columbia, USA

*Bio and abstract not available.*



[Oscar Sans](#), Medical Director at AdSalutem Institute and Chief of the Sleep Unit at Sant Joan de Déu **Children's** Hospital, Barcelona, Spain

Dr. Sans is currently the medical director of AdSalutem Institute, Sleep medicine as well as Chief of the Sleep Unit of Sant Joan de Déu children's hospital. He is from 2017, associate professor of the International University of Catalonia (UIC). He received his M.D. from the Universitat Autònoma de Barcelona (UAB), completed his neurophysiology residency at the Miguel Servet University Hospital in Zaragoza. He then completed his pediatric sleep medicine training, from 2004 till 2008, at the University of Louisville under the mentorship of professor David Gozal who was at that time the **Children's Hospital Foundation Chair for Pediatric Research, Distinguished University Scholar, Director of the Kosair Children's Research Institute, and Chief of the Division of Pediatric Sleep Medicine and the Sleep Medicine Fellowship Program**, both of which were recognized as programs of distinction by the AASM. From 2008 until 2017, Dr. Sans served as coordinator of the Sleep Unit of Sant Joan de Déu **children's** hospital. He has published over 50 peer-reviewed original articles, as well as 10 book chapters and reviews.

## Sleep and scholar performance

Sleep plays a vital role in brain function and systemic physiology across many body systems. Problems with sleep are widely prevalent and include deficits in quantity and quality of sleep; sleep problems that impact the continuity of sleep are collectively referred to as sleep disruptions. Numerous factors contribute to sleep disruption, ranging from lifestyle and environmental factors to sleep disorders and other medical conditions. Sleep disruptions have substantial adverse short- and long-term health consequences. Sleep disruption is associated with increased activity of the sympathetic nervous system and hypothalamic–pituitary–adrenal axis, metabolic effects, changes in circadian rhythms, and proinflammatory responses. In otherwise healthy adults, short-term consequences of sleep disruption include increased stress responsivity, somatic pain, reduced quality of life, emotional distress and mood disorders, and cognitive, memory, and performance deficits.

For adolescents, psychosocial health, school performance, and risk-taking behaviors are impacted by sleep disruption. Behavioral problems and cognitive functioning are associated with sleep disruption in children; regarding this, parents and teachers of children with sleep alterations often report cognitive and behavioral difficulties such as inattention, restlessness, aggressiveness and learning difficulties.

Long-term consequences of sleep disruption in otherwise healthy individuals include hypertension, dyslipidemia, cardiovascular disease, weight-related issues, metabolic syndrome, type 2 diabetes mellitus, and colorectal cancer. All-cause mortality is also increased in men with sleep disturbances. For those with underlying medical conditions, sleep disruption may diminish the health-related quality of life of children and adolescents and may worsen the severity of common gastrointestinal disorders.

As a result of the potential consequences of sleep disruption, health care professionals should be cognizant of how managing underlying medical conditions may help to optimize sleep continuity and consider prescribing interventions that minimize sleep disruption.

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**Sonia Ancoli-Israel**, Professor Emerita at University of California San Diego, San Diego, USA

Sonia Ancoli-Israel, Ph.D. is a Professor Emerita and Professor of Research in the Departments of Psychiatry and Medicine at the University of California San Diego (UCSD) School of Medicine. Dr. Ancoli-Israel received her Bachelor's Degree from the State University of New York, Stony Brook, a Master's Degree in Psychology from California State University, Long Beach and a Ph.D. in Psychology from the University of California, San Francisco. Dr. Ancoli-Israel's expertise is in the field of sleep disorders and circadian rhythms particularly in normal aging and neurodegenerative disease, and in cancer. Her research has included studies on the longitudinal effect of sleep disorders on aging, therapeutic interventions for sleep problems in dementia, and in the relationship between sleep, fatigue and circadian rhythms in cancer. Dr. Ancoli-Israel is Past-President of the Sleep Research Society (SRS), Past-President of the Society for Light Treatment and Biological Rhythms and was on the founding Executive Board of the National Sleep Foundation. She was honored in 2007 with the National Sleep Foundation Life Time Achievement Award and the SRS Mary A. Carskadon Outstanding Educator Award, in 2012 with Society of Behavioral Sleep Medicine Distinguished Career Award and in 2014 with the SRS Distinguished Scientist Award. Dr. Ancoli-Israel is published regularly in medical and psychiatric journals with close to 500 publications in the field.

### Sleep in the Older Adult

There are some who believe that as we age, we sleep fewer hours than younger adults. Yet most epidemiological studies have shown that older adults report sleeping about seven hours a night, well within the normal recommended range. The amount of deep sleep (slow wave sleep) does decrease with age, but this reduction begins in the third-fourth decades and stabilizes by our sixties. Nevertheless, there are changes in sleep that are connected to aging. The circadian rhythm advances, resulting in early evening sleepiness and early morning awakening which can be misinterpreted as insomnia. Sleep efficiency is reduced, likely a result of sleep disturbances which become more common with age. The sleep disturbances however, are not a result of aging per se, but rather are almost always related to medical/psychiatric problems, medications and polypharmacy or primary sleep disorders whose prevalence increases with age, such as insomnia, sleep disordered breathing, REM behavior sleep disorder, restless legs syndrome, and periodic limb movements in sleep. Treatment for these sleep disorders should be considered, regardless of age, to prevent or ameliorate some of the negative consequences of these sleep problems.

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## Session 6. Summary session: Sleep for healthy ageing

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**Manuel Sánchez de la Torre**, Associate Professor at University of Lleida and Researcher at CIBERES, Lleida, Spain

Dr. Manuel Sánchez-de-la-Torre received his degree in Biology in 2003 in the University of Jaen, (Jaén, Spain), and his PhD in Biology from the University of Lleida (Lleida, Spain), in 2007. In his thesis work he evaluated the impact of host genetic variation on infection with HIV-1. After completing his PhD, he accepted a position as research coordinator in the Translational Research in

Respiratory Medicine group at the IRB Lleida and Biomedical Research Networking Center Consortium for Respiratory Diseases (CIBERES, Madrid, Spain), a group led by Dr. Ferran Barbé. He also performed a research fellowship at the group led by Dr. David Gozal, at the University of Chicago. During his fellowship, Dr. Sánchez-de-la-Torre pioneered the precision medicine in sleep apnea and hypertension, developing a microRNA based system that predicts clinical response to sleep apnea treatment. In 2008, Dr. Sánchez-de-la-Torre accepted an Associate Professor position at the University of Lleida, where he has been since that time. In 2015, he accepted the National Coordination in Sleep in CIBERES. Dr. Sánchez-de-la-Torre obtained the Young Researcher of Spanish Respiratory Society (SEPAR) award in 2016, the Best original publication in Sleep Society award in 2015, and the Young Researcher Award of Astra-Zeneca Foundation in 2016. Manuel Sánchez-de-la-Torre's work focuses on sleep apnea. His research aims to achieve a better understanding of the pathogenesis of the cardiovascular consequences for sleep apnea patients, to evaluate new diagnostic and therapeutic options in such patients, and developing of precision medicine in sleep apnea. Manuel Sánchez-de-la-Torre has had 66 papers published in peer-reviewed journals; these papers have received over 800 citations.



**Marco Inzitari**, Director of Healthcare, Research and Teaching at Pere Virgili Health Park, Barcelona, Spain

Marco Inzitari, MD, PhD, specialist in geriatrics, was trained in aging and epidemiological research at the Universities of Florence, Italy, and of University of Pittsburgh, USA. He serves as the Director of Healthcare, Research and Teaching of Parc Sanitari Pere Virgili, as an Associate Professor of Medicine at the Universitat Autònoma de Barcelona, and as the PI of the RE-FIT Barcelona (Research on Aging, Frailty and Transitions in Barcelona) research group of Vall d'Hebrón Institute of Research (VHIR). He is the current President of the Catalan Society of Geriatrics and Gerontology.

Dr. Inzitari authored more than 50 international publications on frailty, cognitive and physical function in the elderly, and on care models and organization for older and chronic patients, and is the PI of 3 ongoing publicly funded research projects on these topics. He is member of the editorial board of "The Frailty and Aging Journal", and has served as an expert advisor for EU-funded research projects and for different other projects funded by non-lucrative international institutions (including the Government of Canada and the Inter-American Development Bank).

Dr. Inzitari serves as an expert advisor of the Plan for integrated health and social care (PIAISS) of the Catalan Government., and of the Clinical Management Section of the Catalan Society for Healthcare Management. Moreover, he is the co-leader of the Special Interest Group on Intermediate Care at the International Foundation of Integrated Care (IFIC), and is an advisor of AdSalutem Institute for Healthy Sleep.

Chairs of session 6.

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**Mary Morrell**, Professor of Sleep and Respiratory Physiology at Imperial College London and Royal Brompton Hospital, London, UK

As a student, Professor Morrell developed an interest in the control of breathing during sleep which continues to drive her research at the National Heart and Lung Institute, Imperial College London.

**Professor Morrell's research focuses on the causes and consequences of sleep disordered breathing; particularly the impact of intermittent hypoxia on the brain.** Her aim is to translate physiological research into improvements in patient care. Recently, she developed a UK respiratory-sleep network facilitating multi-center trials. The network has previously completed a trial to determine the impact of treating OSA in older people, and is



currently investigating mild OSA. Mary has served on the American Thoracic Society Board of Directors, the Physiological Society Executive Board and she is a Past-President of the British Sleep Society.

## Sleep disruption and cognitive impairment

A growing body of evidence suggests that sleep disruption, especially associated with Obstructive Sleep Apnoea (OSA), produces a consistent pattern of deficits in cognition, particularly in relation to attention, episodic memory, and executive function. However, explanations vary regarding *how* sleep disruption affects cognition, and reliable evidence is hard to find. This issue may relate to the many, common comorbid conditions that are present in patients with sleep disruption, especially older people, such as OSA. This presentation will review the evidence for cognitive impairment in sleep disruption, using OSA as a model, and focusing on the methodological and theoretical challenges of exploring the effect of sleep on cognition. To conclude, the presentation will review future directions for the field including suggestions of core design elements for future studies.

Where do we go from here? The number and type of studies exploring the extent to which sleep impacts on cognitive function is growing exponentially. Given the increasing prevalence of road traffic and work-place accidents, the large number of shift-workers, and the links between sleep disruption and cognitive dysfunction in older people, this focus is warranted. However, little is known about who is most at risk of cognitive impairment, and subsequent dementia. Defining who, why and how future studies can provide treatments to the most vulnerable individuals are important targets. It is hoped that the B-DEBATE will enable the field to focus on these questions and support the development of future research.

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**Jamie Zeitzer**, Associate Professor at Stanford University, Palo Alto, USA

Dr. Zeitzer is an associate professor of Psychiatry and Behavioral Sciences in the Division of Sleep Medicine at Stanford University, as well as a science specialist at the U.S. Department of Veterans Affairs. He is a world-expert on sleep and circadian rhythms. He received his undergraduate degree in Biology from Vassar College, PhD in Neurobiology from Harvard University, and completed post-doctoral fellowships at UCLA and Stanford University. His studies have been ongoing for more than 20 years and yielded more than 100 peer-reviewed manuscripts on the impact of light on human biology, translational sleep physiology and pharmacology, and the interaction of sleep and circadian rhythms in a variety of disease states, including traumatic brain injury, bipolar disorder, breast cancer, dementia, and spinal cord injury. His current work examines novel ways in which light can be manipulated to optimize its clinical and biological impact on sleep and circadian rhythms. A parallel line of research aims at using modern statistical and engineering technology to discover new ways of harmonizing objective and subjective measures of sleep quality.

## Defining healthy sleep and circadian rhythms

While healthy sleep and circadian rhythms are an indisputable foundation for overall human health, how we define what constitutes “healthy” sleep and rhythms is often ignored. With the explosion of wearable and at-home devices that can record a variety of physiologic data, we are afforded an opportunity to gain a better understanding of what constitutes normal, healthy sleep. Furthermore, these device allow us to monitor longitudinal changes in sleep and circadian rhythms, how to specifically target these changes, and how these changes could lead to improved physical and mental health. My laboratory has been exploring the three parts of this equation – (1) What are the physiologic variables that provide the most insight? (2) What are the outcome measures associated with changes in these variables? and (3) How do we manipulate sleep and circadian rhythms in a personalized, actionable manner? Data from both tightly controlled laboratory and ecologically-relevant cohort studies will be discussed to delineate the capacity of the sleep and circadian systems and how these systems can be altered within the context of normal behavior.

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**Manolis Kogevinas**, Professor at Barcelona Institute for Global Health (ISGlobal), Barcelona, Spain

Read bio in page 16.

## Diet and sleep

Modern life involves mistimed sleeping and eating patterns that in experimental studies are associated with adverse health effects including obesity, cardiometabolic outcomes and cancer. Studies on nutrition and cancer in humans have focused on type (e.g. consumption of fruits and vegetables) and quantity of food intake, rather than on timing of eating. In this presentation I will discuss the effect of mistimed eating patterns and sleep in humans and present recent findings showing that adherence to a diurnal eating pattern is beneficial for health.

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**Scott Kutscher**, Clinical Assistant Professor at Stanford University Medical Center, Redwood City, USA

Dr. Kutscher is a Clinical Assistant Professor in the Department of Psychiatry & Behavioral Sciences. As a board certified Neurologist and Sleep Specialist, he has an understanding of the full spectrum of sleep disorders, with a special focus on sleep in human performance and neurodegenerative diseases. He has worked with individual athletes as well as teams on optimizing sleep to improve athletic performance, and conducted research as a PI or co-investigator on athletes in roles that have included recruitment, education, study design and execution, and data analysis.

### Sleep and Performance in Elite Athletes

Elite athletes are increasingly leveraging the principles of sleep science to enhance recovery, improve performance, and prevent injury. This session will review the most recent literature on sleep and performance in athletics and common challenges athletes face in optimizing sleep. Attendees will understand how providers can use the principles of sleep science to work with athletes, trainers, and coaches at all levels of competition, including how homeostatic and circadian drives influence athletic performance, and the relationship between sleep and athlete wellbeing. Participants will know the presentation and management of common sleep disorders in athlete populations and will be provided a practical framework for leveraging sleep science to improve performance in elite athlete populations.

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# POSTERS

1. Alicia Sánchez-de-la-Torre, Sandra Bertran, Kelly Loffler, Douglas McEvoy, Manuel Sánchez-de-la-Torre, Jorge Abad, Joaquín Duran-Cantolla, Valentín Cabriada, Olga Mediano, María José Masdeu, Joaquín Teran, Juan Fernando Masa, Mónica de la Peña, Mercè Mayos, Ramón Coloma, Josep M Montserrat, Eusebi Chiner, Salvador Perelló, Gemma Rubinós, Albina Aldoma, Estefanía Galera, Olga Mínguez, Lydia Pascual, Anunciación Cortijo, Dolores Martínez, Anna Mas and Ferran Barbé, on behalf of the Spanish Sleep Network. Baseline description of patients with obstructive sleep apnea who have suffered a coronary syndrome: SAVE and ISAACC studies.
2. A.L. Castro-Grattoni, M. Suarez-Giron, I. Benitez, A. Moraleja, L. Techia, M. Torres, I. Almendros, R. Farre, J.M. Montserrat, M. Dalmases, D. Gozal, F. Barbé and M. Sánchez-de-la-Torre. Effect of age on the cardiovascular remodeling induced by chronic intermittent hypoxia as a murine model of sleep apnea.
3. Ana Jordan, M. Dolores Liaño, Judith Mencía, Sergio García, Ali Dorgham and M. Inmaculata Ramos; Linde Médica Spain. Impact of CPAP treatment on the lives of patients with OSAS: difficulties, benefits, and expectations.
4. A. Zapater<sup>1</sup>, C. Girón, L. Pinilla, F. Santamaria-Martos, I. Benítez, F. Barbé, J.M. Fernandez-Real, F. Ortega and M. Sánchez-de-la-Torre. Identification and Validation of Circulating miRNAs as Endogenous Controls in Obstructive Sleep Apnea.
5. Anna Gaeta, Benítez, Gerard Torres, Faride Dakterzada, Olga Mínguez, Raquel Huerto, Montse Pujol, Anna Carnes, Mireia Dalmases, Alfonso Arias, Aurora Gibert, Manuel Sanchez de la Torre, Ferran Barbé and Gerard Piñol-Ripoll. **STOPBANG and Berlin Questionnaire to identify obstructive sleep apnea in Alzheimer's disease.**
6. Anna Gaeta, Ivan Benítez, Gerard Torres, Faride Dakterzada, Olga Mínguez, Raquel Huerto, Montse Pujol, Anna Carnes, Mireia Dalmases, Alfonso Arias, Aurora Gibert, Manuel Sanchez de la Torre, Ferran Barbé and Gerard Piñol-Ripoll. OSA prevalence and cognitive assessment in mild-moderate AD.
7. Mireia Felez-Nobrega, Catalina Bonet, Kieran P. Dowd and Anna Puig-Ribera. The relation of physical activity, sedentary behavior and sleep to fluid intelligence in college students. An integration of the 24-hour period.
8. Cecilia Turino, Xavier Rafael-Palou, Eloisa Vargiu, Rafaela Vaca, Ivan Benitez, Ana Mayoral, Alexander Steblin, Lydia Pascual and Ferran Barbé. MyOSA: management and treatment of patients with Apnoea-hypopnea syndrome through a telemedicine system.
9. E. Sapiña, M. Dalmases, G. Torres, J. Abad, M. Félez, J.F. Masa, A. Fortuna, F. García, O. Mínguez, L. Pascual, R. Vaca, L. Drager, L. Ronald, M. Sánchez-de-la-Torre and F. Barbé. Obstructive sleep apnea and resistant hypertension: Prevalence and clinical characteristics.
10. F. Santamaría-Martos, I. Benitez, F. Ortega, A. Zapater, C. Girón, L. Pinilla, L. Pascual, O. Mínguez, A. Cortijo, S. Gómez, J.M. Fernandez-Real, F. Barbé and M. Sánchez-de-la-Torre. MicroRNA profile in patients with obstructive sleep apnoea.
11. Jesús Pujol Salud. Prevalence of insomnia and its relationship with clinical, pharmacological and social factors.
12. Jon Frias, Magdalena Guardiola, Jordi Ponce, Joan Brunet, Josep Maria Piulats, Miquel Àngel Pavón, Yolanda Benavente, Francesc Xavier Matias-Guiu, Silvia de Sanjosé, Laia Alemany and Laura Costas, on behalf of the Screenwide Team. Night shift work and chronotype and risk of endometrial and ovarian cancers.
13. Jordi de Batlle, Núria Roure, Ivan D Benitez and Ferran Barbé. Sleep Health, a neglected Pillar of Health?
14. M<sup>a</sup> Jesús Muniesa Royo, Juan Ezpeleta Campaña, Iván Benítez, Manuel Sánchez de la Torre and Ferran Barbé IIIa. The effect of nocturnal continuous positive airway pressure therapy on the 24-hours intraocular pressure rhythm in patients with sleep apnea-hypopnea syndrome using a contact lens sensor.
15. María Fernanda Zerón-Ruggerio, Antoni Diez-Noguera, Trinitat Cambras Riu and María Izquierdo-Pulido. Sleep quality, social jetlag and adherence to the Mediterranean diet: impact on the body mass index.

16. Marta Castellano, David Ibañez, Jean-François Gagnon, Jacques Montplaisir, Ronald B. Postuma, Aureli Soria-Frisch and Giulio Ruffini. Sleeping into Parkinson's: dipole activity predicts RBD conversion.
17. Rodrigo Torres-Castro, Jordi Vilaró, Joan-Daniel Martí, Onintza Garmendia, Elena Gimeno-Santos, Bárbara Romano Androni, Jorge Rodríguez, Cristina Embid and Josep M. Montserrat. Effects of a combined community exercise program in obstructive sleep apnea syndrome: a randomized clinical trial.
18. Timo Lauteslager, Stylianos Kampakis, Adrian Williams, Michal Maslik and Fares Siddiqui; Circadia Technologies Ltd. Performance Evaluation of a Novel Non-Contact and Non-Invasive Bedside Sleep Monitor for a Closed-Loop Therapy System.
19. L. Lahuerta, H. Illera, E. Gómez and MD. Navarro. Care and improvement of rest in hospitalized patients at the Hospital Sant Joan de Déu (Sueñon®)
20. Yolanda Castillo, Ignasi Ferrer, Monique Suárez, Josep María Montserrat and Raimon Jané. mHealth Approach to Monitor Sleep Apnea Patients at Home
21. L. Molina-Bosch, M. Pujol, A. Guardia, J.C.E. Serrano. Pilot study to evaluate the dietary patterns and dietetic behaviours in patients with central hypersomnia.
22. A. Garcia-Saenz, K. Papantoniou, E. Guinó, G. Castaño-Vinyals, M. Pollán, V. Martín Sanchez, I. Gómez Acebo, J.J. Jiménez Moleón, R. Peiro, E. Ardanaz, J. Alguacil, J.M. Alzibar, A. Tardón, M.-D. Chirlaque, V. Moreno and M. Kogevinas. Sleep and gastrointestinal cancer risk in the MCC-Spain case-control study
23. Alba Sandoval. MORFEO'S PROJECT: Improve of the nightly rest of the hospitalized geriatric patients.

# PRACTICAL INFORMATION

## Venue: CosmoCaixa Barcelona

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CosmoCaixa Barcelona  
C/ Isaac Newton, 26  
08022 Barcelona, Spain

Conference room  
Auditori (-2 floor)

Free wifi 

1. Select [wifi\\_cosmocaixa\\_bcn](#)
2. Open an Internet Browser
3. The page of CosmoCaixa will appear. Follow the instructions

### Security issues:

The conference room will remain open. Please take care of your personal belongings, specially in the breaks. The Organizers won't be responsible of any loss or robbery ocured in the context of B-Debate.

## Contact persons during the event

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[www.bdebate.org](http://www.bdebate.org) | [www.biocat.cat](http://www.biocat.cat)

# SUGGESTED READING

- Barbé, F., Navarro, M.D., Dalmasas, M., Escarrabill, J., Varela, J., Bruna, G. **“Informe sobre la salud del son”** (2017). Global Observatory for Healthy Sleep, [http://sleepobservatory.org/observatori\\_global\\_del\\_son/informe\\_salut.html](http://sleepobservatory.org/observatori_global_del_son/informe_salut.html)
- Cappuccio FP, Miller MA, Lockley SW. Sleep, Health and Society. From Aetiology to Public Health. Oxford: Oxford University Press , 2010: 488. <http://doi.org/10.1093/acprof:oso/9780199566594.001.0001>
- Pack A. Application of Personalized, Predictive, Preventative, and Participatory (P4) Medicine to Obstructive Sleep Apnea. A Roadmap for Improving Care? Annals Am. Thor. Soc. <http://doi.org/10.1513/AnnalsATS.201604-235PS>
- Kawada, T. et al. (2016). Sleep duration and coronary heart disease mortality. Int J Cardiol. , 215, 110. <http://doi.org/10.1016/j.ijcard.2016.04.049>
- Linn B., et al. Self-reported sleep duration and coronary heart disease mortality: A large cohort study of 400,000 Taiwanese adults. Int J Cardiol . 207, 246–251. <http://doi.org/10.1016/j.ijcard.2016.01.044>
- Sánchez-de-la-Torre, et al. (2013). Obstructive sleep apnoea and cardiovascular disease. The Lancet Res. Med. , 1(1), 61–72. [http://doi.org/10.1016/S2213-2600\(12\)70051-6](http://doi.org/10.1016/S2213-2600(12)70051-6)
- Bailly, S., et al. (2016). Obstructive Sleep Apnea: A Cluster Analysis at Time of Diagnosis. PLoS ONE , 11(6), e0157318. <http://doi.org/10.1371/journal.pone.0157318>
- Micheli K, et al. (2011). Sleep patterns in late pregnancy and risk of preterm birth and fetal growth restriction. Epidemiology. ;22(5):738-44. doi: 10.1097/EDE.0b013e31822546fd.
- Martínez-García, MÁ, et al. Cancer and Obstructive Sleep Apnea: current evidence from human studies.(2016) CHEST. <http://doi.org/10.1016/j.chest.2016.04.029>
- Gozal, D. et al. Obstructive sleep apnea and cancer: Epidemiologic links and theoretical biological constructs. Sleep Medicine Rev. 27, 43–55. <http://doi.org/10.1016/j.smrv.2015.05.006>

# OUTCOMES

## B-Debateca

On the website of B-Debate, you will find all the information related with the celebration of the meeting that includes reports, conclusions, scientific documents, interviews with the experts, speaker's CVs, videos, images, press documentation and other related materials. We invite you to visit the section B-Debateca on [www.bdebate.org](http://www.bdebate.org)

Contents of the meeting: "Sleep: the Fourth Pillar of Health"

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INICI / Debateca / Programa anual 2017/2018

**Programa anual 2017/20**

PROGRAMA 2017/18  
PROGRAMA 2016/17  
HISTÒRIC DE DEBATS  
CICLES DE DEBATS

**20/04/2017 a 21/04/2017**  
**The Genotype Tissue Expression (GTEx) Project Community Meeting. Enhancing the Usage of Human Genomics for the benefit of all**  
El projecte Genotype-Tissue Expression (GTEx) ha creat un mapa públic d'expressió i regulació gènica a través de múltiples teixits humans. Aquest recurs ja està proporcionant informació valuosa sobre els mecanismes específics de la regulació de gens en teixits, donant lloc a estudis sobre l...

**23/05/2017 a 24/05/2017**  
**Zika virus and other mosquito-borne viruses. Science for preparedness and response in the Mediterranean region**  
L'epidèmia global de Zika ens recorda el risc real d'importar patògens exòtics a la regió

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B-Debate International Center for Scientific Debate Barcelona is a joint initiative of Biocat and “**la Caixa**” Foundation. It drives first-rate international scientific debates, to foster dialogue, collaboration and open exchange of knowledge with prestigious national and international experts, to approach complex challenges of high social interest in life sciences. B-Debate sees debate as a powerful, effective way to generate knowledge and strives to help position Barcelona as a benchmark in generating knowledge and Catalonia as a country of scientific excellence.

The debates are top-notch international scientific meetings featuring a selection of experts of renowned international prestige and scientists that work in Barcelona and Catalonia, moderated by scientific leaders. Since 2009 B-Debate has invited about 1750 recognized speakers and over 13.000 attendees. B-Debate seeks out answers to the challenges and needs of society in the field of life sciences, taking into account the complex, ever-changing conditions of this global world. The debates foster the integration of different disciplines of science and deal with such diverse topics as ageing, new therapeutic approaches to various diseases, innovative technology to improve knowledge of the human genome, food resources, new tools to integrate knowledge management, clinical genomics, neurosciences, climate change, and new energy sources, among others. The knowledge and results obtained through these events is spread throughout both the scientific community and general society through the various B-Debate channels and instruments.

More info: [www.bdebate.org](http://www.bdebate.org)

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The Global Observatory for Healthy Sleep is a non-profit organization dedicated to fostering social and clinical awareness of the importance of sleep as a fundamental pillar of health. To this end, the Observatory promotes and supports activities for the advancement and dissemination of research on sleep in its social and clinical dimensions, and seeks to act as a liaison between researchers, medical practitioners, patient advocacy groups, policymakers and grassroots movements to coalesce and drive forward social and research projects focused on the repercussion of sleep on human well-being.

More information: <http://sleepobservatory.org/>



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The Lleida Biomedical Research Institute (IRBLleida) was founded in 2004 with the signing of a cooperation agreement between the Catalan Health Institute (ICS), the Dr Pifarré Foundation and the University of Lleida (UDL). It comprises biomedical research groups from the region of Lleida, more specifically from the UDL and the health system. The groups cover all three aspects of biomedical research: basic, translational and clinical epidemiological research.

The IRBLleida was set up with the aim of creating synergies between basic, clinical and epidemiological research to improve the daily clinical practice and benefit the entire population. It is a CERCA centre, a member of the biocluster supported and supervised by the Autonomous Government of Catalonia and it is also accredited as a Centre of Excellence by the Carlos III Health Institute (funded by Spanish Government).

More info: <http://www.irblleida.org>

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AdSalutem Institute is an open, innovative and enterprising organization devoted to the promotion of Healthy Sleep for maintaining good health and recovering from illness. Born with a markedly international projection, AdSalutem Institute is made up by highly qualified multidisciplinary healthcare professionals specialized in Sleep medicine that are committed to coming up with innovative solutions for prevention and treatment of Sleep problems in society.

AdSalutem Institute's activity is organized in three areas: Knowledge, Clinical Assistance and Knowledge Dissemination. This way, AdSalutem institute is able to manage knowledge in sleep medicine in all stages: from the generation, to making the most of it to benefit society and treat sleep disorders in complex clinical situations. In this regard, we seek medical solutions to unresolved sleep problems to improve our patients' prognosis and health.

More info: [adsalutem.institute](http://adsalutem.institute)

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Philips is a company leader in health technologies, focused on improving people's lives and aiming better results in the continuum of health, from healthy habits and prevention, to diagnosis, treatment and care at home.

More info: <http://www.philips.es/>

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OXIGEN Salud has been offering its services for almost 50 years to supply the necessary gases and equipment for the treatment of patients with chronic respiratory ailments. As a result of the technological advances of the sector throughout these decades, the company has considerably expanded its portfolio of products, services and therapies, redefining itself towards oxygen therapy and other respiratory therapies, offering a care service that covers the individual needs of each patient. The company also supplies electromedical equipment and medical gases to hospitals and health centers.

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ResMed, a world-leading connected health company with more than 6 million cloud-connected devices for daily remote patient monitoring, changes lives with every breath. Its award-winning devices and software solutions help treat and manage sleep apnea, chronic obstructive pulmonary disease and other respiratory conditions. Its 6,000-member team **strives to improve patients' quality of life**, reduce the impact of chronic disease and save healthcare costs in more than 120 countries.

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More info: <https://www.vitalaire.es/>

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More info: <http://www.linde.es/>

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