

VELUX STIFTUNG

ANNUAL REPORT 2018

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I. MISSION & FUNDING POLICY

Velux Stiftung is an independent charitable foundation supporting research projects in the areas of Daylight Research, Healthy Ageing Research and Ophthalmology Research.

Sustainable improvement for the benefit of society

The mission of the foundation is to make a contribution to sustainable improvement for the benefit of society. This is achieved by promoting the creation of new knowledge through cutting-edge research and its dissemination and application. By focusing on projects with a high potential for change and impact, the foundation aims to achieve a leverage effect. A decisive factor in realising this potential is an entrepreneurial spirit in research and efforts to promote and implement the knowledge created.

Striving for impact

Velux Stiftung's funding policy favours research projects that stand out for their originality, novelty and out-of-the-box thinking– as well as for their high potential to have an impact on sustainable improvement for the benefit of society.

While it is almost impossible to track the societal impact of single research project, it is possible to foster the impact potential of a project by delineating the process of how impact could be created. This aspect contributes greatly to the funding decision.

The foundation's theory of change is grounded in the IOOI-model, Input (investments like know-how, human capital, funding) enables Output (project deliveries such as new knowledge, dissemination activities, guidelines, tools, implementation). In order that output contributes to the envisioned change, the transfer to target groups needs to be facilitated. Outcome is characterized by a realised change in a specific target group (new methods, standards or solutions are used by the target group). Once the change reaches a societal level, Impact has been achieved (e.g. better health, better quality of life, mitigation of climate change).

Taking the initiative

Many challenges of today's society cannot be easily solved. Sometimes it is difficult to prioritize where to start or it takes a fresh and multifarious approach and other times it is difficult to see how easy it could be solved. That's where Velux Stiftung also initiates projects that raise awareness or bring different disciplines together to start an interdisciplinary exchange. The foundation's own projects intend to facilitate knowledge transfer and enable new ways of collaboration.

II. DAYLIGHT RESEARCH

Velux Stiftung supports research on the effects and utilization of daylight in three fields: Daylight & Human; Daylight & Nature; Daylight Technology.

Daylight is essential for life. It represents the pacemaker and an essential source of energy for human beings and the environment around us. In nature, the circadian and the annual cycle of the sun set the rhythm of life. In plants, daylight is the source of energy required to convert carbon dioxide and water into sugars. For humans, daylight is important for health and well-being, it sets our circadian clock and can provide clean energy through photovoltaics. Daylight is a resource that is available as an almost infinite supply and – if we make sensible use of it – can help solve energy problems, be beneficial to health and even ease illnesses. Velux Stiftung is keen to unlock these key questions, as we are still a long way from tapping the full potential daylight offers.

While there already exists a wealth of knowledge about the effects of daylight on humans, many findings have not yet reached a broader audience. The International Daylight Award intends to raise awareness for the implementation of the existing knowledge and is a joint initiative of Velux Stiftung with its Danish sister foundations.

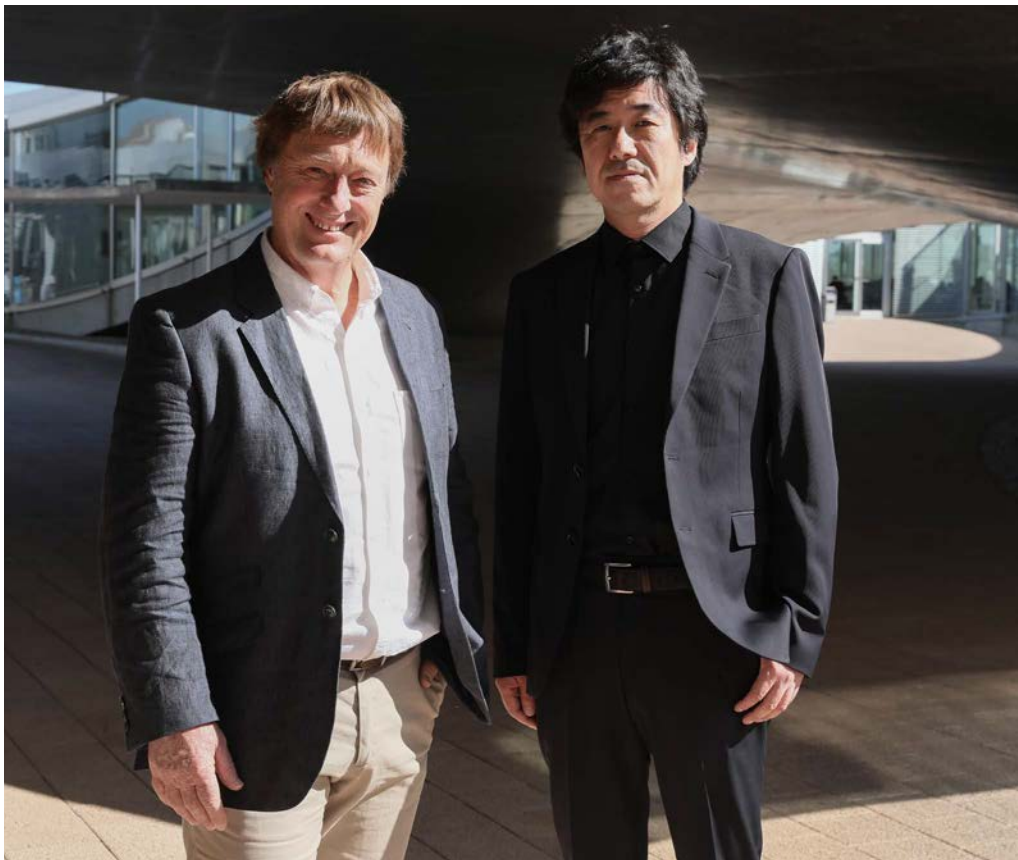
Studying the effects of daylight is important but it is impossible to attribute this to a single research discipline. Insights from one discipline often have cross-disciplinary implications and hold the potential for synergies. The foundation facilitates the exchange between researchers and professionals from different fields through the Daylight Academy.

INTERNATIONAL DAYLIGHT AWARD

The International Daylight Award is an initiative to raise awareness for the influence of daylight. The prize of EUR 100'000 is granted every two years for exceptional achievements with regard to the role of daylight in research and architecture.

On the 16th of May, the UNESCO International Day of Light, the laureates of 'The Daylight Award 2018' were announced. The Japanese architect Hiroshi Sambuichi was awarded for his poetic use of daylight in architecture and the American researcher Greg Ward for his pioneering work on lighting simulation.

The award ceremony took place on 27 September at the Rolex Learning Center at EPFL in Lausanne. Architects, researchers and business representatives engaged in building and architecture as well as researchers from other disciplines of the wider Lausanne area accepted the invitation to join the event. The two laureates



The laureates of The Daylight Award 2018: Greg Ward (left) and Hiroshi Sambuichi (right).
Photo credit: Alain Herzog

each gave a presentation which brilliantly illustrated the versatility of working with daylight:

Hiroshi Sambuichi is a master at balancing the relationship between nature and architecture. Inspired by nature, he integrates geophysical characteristics of the site; earth, wind, air, water, and sun in his architecture. His buildings serve as a continuous inspiration to the architectural discourse. With extraordinary simplicity and by allowing daylight to always be present in its variable forms, his buildings do not objectify light as a singular event but rather open our awareness and let us experience light to be timeless, fluid and rich.

Greg Ward is the creator of the revolutionary software simulation programme Radiance, which has enabled three decades of researchers to imagine the possibilities of daylight. Radiance is widely applied in architecture, product design, horticulture, motion picture, health effects and medical research. It has also been utilized in unique situations such as assisting astronauts in training to work under the harsh lighting conditions in space.



The inspiring event was hosted by Lykke Ogstrup Lunde, the Chairwoman of Velux Stiftung as representative of the three philanthropic foundations presenting the award: Velux Stiftung (CH), Villum Fonden and Velux Fonden (DK). Photo credit: Alain Herzog

DAYLIGHT ACADEMY

The Daylight Academy is an interdisciplinary platform to foster exchange between the different disciplines and fields of expertise working on daylight. The Daylight Academy wants to promote international and interdisciplinary cooperation among scientists, architects and other professionals involved in Daylight Research or with a strong interest in daylight related topics with the aim to initiate innovation and new knowledge.

In 2018 the steering committee of the Daylight Academy had to decide on eight project outlines that were initiated at the previous annual conference. The steering committee made headway by taking a strategic decision: It decided to support activities which uncover essential and basic questions that need to be addressed in the field of Daylight Research as well as activities that work out guidelines or blueprints on how to execute the corresponding research. The steering committee decided on this strategy with the goal to create sustainable leverage in the field.

As a consequence, the following four projects were supported:

1. Article "Natural or Artificial Daylight: What makes the difference?"
2. Meta-analysis "State of Light in Humans"
3. PhD Winter School "Perspectives on Daylight "
4. Workshop series "Daylight and Green cities"

In project 1 "Natural or Artificial Light: What makes the difference?" the working group met in June and has since worked with dedication on their position paper. A final version is expected for spring 2019. The participants in project 2 "State of Light in Humans" have worked on an article which focuses on the present knowledge gaps. It is expected for summer 2019. Project 3, the PhD Winter School is organized in collaboration with ETH Sustainability and will take place in January 2019. Project 4 "Daylight and Green Cities" organised their first workshop in Aarhus in September which was attended by 18 international architects, urban planners, ecologists, engineers, health experts, artists and practitioners in order to

devise a framework for urban planning, capitalizing on the benefits of daylight and green solutions for buildings.

The Annual Conference of 2018 took place on 25-26 October at an extraordinary venue: The Cathedral of the Dublin Institute of Technology. For two days 70 participants with very different backgrounds met in Dublin for their annual dose of interdisciplinary exchange with other daylight experts. The four keynotes on the first day reflected very different perspectives on daylight and were much appreciated by the attendees. On the second day, the participants had the opportunity to exchange and develop ideas in four interdisciplinary workshops. For the first time, the majority of attendees were not members and the Daylight Academy could welcome many “new faces”, which introduced fresh ideas into the discussions.



The Annual Conference 2018 of the Daylight Academy took place at the Cathedral of the Dublin Institute of Technology in Ireland. Photo credit: Maxwell Photography, Dublin

APPROVED EXTERNAL PROJECTS IN 2018

1. DAYLIGHT AND MENTAL HEALTH

Prof. Dr. Klaus Martiny, Rigshospitalet, Mental Health Center
Copenhagen, Denmark
CHF 608'000 (DKK 3'957'000)

The research area is daylight and mental health. The proposal concerns new treatments of depression, using improved methods to deliver daylight and dynamic lighting. These methods will be tested incorporating new technology, both at psychiatric hospital wards and in outpatient settings. This research will also be extended to residential areas, the working environment and schools to provide better daylight and dynamic lighting for the improvement of mental health.

2. PRINCIPLES OF HUMAN RESPONSE TO NATURAL DAYLIGHT EXPLORED AT HIGH LATITUDE

Dr. Katharina Wulff, Radiation Sciences, University of Umeå,
Sweden
CHF 450'000 (SEK 4'060'000)

In a unique glass structure, the Nordic Daylight Research Facility, the project will study human physiology under natural light, in an environment of extreme seasonality in Northern Sweden. The ability of environmental light to control circadian patterns of human activity is essential for health and well-being, and it is perturbed in many diseases. By using seasonal adaptation as a proxy to reveal basic biological mechanisms, we will study healthy subjects and those with subsyndromal seasonal mood changes to document differences in seasonal responses across a broad range of circadian parameters.

3. DAY-NIGHT CYCLE IN EPILEPSY

Dr. Maxime Baud, Sleep-Wake-Epilepsy Center (SWEZ)
and Center for Experimental Neurology (ZEN), Inselspital,
Bern, Switzerland CHF 485'000

Epilepsy is a neurological disorder (prevalence of ~1% in the population) defined by the seemingly random recurrence of seizures, often monthly, sometimes daily. Clinical observations suggest that in each individual patient many factors including stress, sleep quality, hormonal changes and time of the day may combine to determine periods of heightened seizure likelihood. For example, seizures can occur at preferential times of the day-night cycle in an individual patient. Yet, these times do not necessarily match across patients, pointing out the need to develop personalized approaches to epilepsy. Using advanced always-available physiological monitoring, we may one day be able to anticipate times of high versus low risk at the individual level. This would be life-changing for patients as the current unpredictability of seizures comes with the burden of constant uncertainty about the presumed imminence of seizures. In this project, we will investigate how the day-night cycle influences the likelihood of seizure occurrence, possibly through hormones and sleep-wake cycles. We will use electro-encephalography and neuronal manipulation techniques in two parallel studies in epilepsy patients and rodents, respectively.

4. INVESTIGATION OF THE BIOSYNTHETIC PATHWAY OF A NOVEL PHYTOHORMONE AND ITS IMPACT ON LIGHT-REGULATED GROWTH AND DEVELOPMENT OF PLANTS

Prof. Dr. Andreas Hiltbrunner, Institute of Biology, University
of Freiburg, Germany CHF 394'190 (EUR 340'000)

Karrikin (KAR) is a component in smoke from bush fires that promotes germination and growth in fire following plant species. Plants also contain an endogenous KAR-like compound, KL, that acts as phytohormone. KAR and KL enhance the response to light and contribute to light-regulated development of plants. Neither the chemical nature nor the biosynthesis pathway of KL is known. The aim of the project is to identify genes required for KL biosynthesis. This is important for understanding light-regulated development of plants and also has potential for application in agriculture.

5. ENHANCING PLANT RESISTANCE THROUGH THE
INTEGRATION OF LIGHT AND VOLATILE CUES

Prof. Dr. Matthias Erb, Institute of Plant Sciences, University
of Bern, Switzerland
CHF 276'000

Plants can use light cues to detect neighbouring plants and induced plant volatile cues to detect herbivores. If they can integrate light and volatile cues to detect herbivore-attacked neighbours, however, remains unknown. The ability to integrate light and volatile may be advantageous for plants, as it may allow them to detect herbivores in close proximity in a more reliable manner and activate their defence systems, accordingly, resulting in an increase of herbivore resistance in anticipation of an attack. This project aims at testing this hypothesis. By combining expertise in light and volatile perception, it will be investigated i) how light cues from competitors affect plant responses to volatile warning cues, ii) if plants can use herbivore-induced changes in light cues from competitors together with volatile warning cues to increase their defences against herbivores, and iii) if and how plant photoreceptors and defence signalling pathways contribute to the above processes.

III. HEALTHY AGEING RESEARCH

Velux Stiftung supports research that aims to maintain or increase the functional ability of older people. This includes basic as well as applied research in the fields of biology, medicine, psychology and neurosciences.

The World Health Organization (WHO) describes Healthy Ageing as the process of developing and maintaining the functional ability that enables well-being in older age. A person's functional ability consists of the individual's intrinsic capacities and the interaction with his or her environment.

In this definition, healthy does not equal disease-free. Many older individuals have well-controlled health conditions that have a small to moderate influence on their functional ability and do not limit their well-being. Ageing includes change in social and behavioural terms besides the physiological transformation. The goal is therefore to enable people to be and do what they value, in a combination of each individual's capacity and the environment. This includes the physical environment such as a person's home as well as the societal environment.

Efforts should therefore strive to limit the burden of disease and strive for well-being and quality of life.

The world is ageing, and the demographic transformation will keep challenging society and health care. In order to align research and efforts of many nations to enable health and well-being of older adults, the foundation supports the WHO in their objective to define research standards, monitoring and research priorities.

There is already some perception on how to foster quality of life, well-being and health during the ageing process. The implementation of these findings depends on many things, whereby the motivation of the individual plays an important role. In order to deepen the understanding how the role of motivation could be integrated into Healthy Ageing Research, the foundation invited an interdisciplinary group of experts to discuss the topic.

HEALTHY AGEING INITIATIVE

The foundation decided last year to facilitate the topic of motivation as another key concept in the interdisciplinary field of Healthy Ageing. Researchers and professionals from psychology, geriatrics, neuroscience, design and public health met to discuss how insight on motivational processes could advance Healthy Ageing.

From various fields 18 selected experts were invited to discuss and define the role of motivation in Healthy Ageing Research and what this means for the quality of life of older adults. Although the questions seemed very simple, the discussion showed that there are many aspects and perspectives on this topic.



The participants' mood of the workshop "Healthy Ageing and Motivation" was most certainly enriched by the beautiful summer weather in Zurich.

The group identified five challenges in order to better integrate motivation into Healthy Ageing Research:

- 1) Contextualization: exploit real-life activity data and combine “lab and life”
- 2) Conceptual refinement & clarity
- 3) Integrative analysis: how to model complex, dynamic, causal systems
- 4) Lab-life-implementation cycle: align research with implementation
- 5) Multi-disciplinary collaborations

The initiative envisions to produce a special issue in an interdisciplinary scientific journal, shedding light on the status quo and the future perspectives of these identified challenges. In a second step, a less specialized publication addressing a broader audience would pick up the core messages and enable a wider dissemination.

APPROVED EXTERNAL PROJECTS IN 2018

6. MOBILITY ASSESSMENT WITH MODERN TECHNOLOGY IN OLDER PATIENTS' REAL-LIFE BY THE GENERAL PRACTITIONER (MOBITEC-GP)

Dr. Timo Hinrichs, Department of Sport, Exercise and Health,
University of Basel, Switzerland
CHF 299'000

Mobility – often referred to as the “sixth vital sign” – is a basic integrator of older adults' health and an important predictor of health-related outcomes such as loss of independence. MOBITEC-GP aims to improve the health of older patients by providing general practitioners with a novel smartphone application that allows them to easily quantify and appraise their patients' real-life mobility. By following their older patients' mobility over time, general practitioners will be able to recognize impending needs within pre-clinical stages of decline and to initiate targeted interventions such as exercise programs or management of joint problems.

7. CAUSES AND CONSEQUENCES OF OXIDATIVE STRESS IN THE GENERAL POPULATION: OXIDATIVE STRESS IN HEALTHY AGING AND CARDIOMETABOLIC HEALTH

Prof. Dr. Diana van Heemst, Section of Gerontology and Geriatrics, Leiden University Medical Center, Leiden, The Netherlands
CHF 298'040 (EUR 257'000)

The project is based on the central hypothesis that high oxidative stress levels are detrimental for the ageing process. It aims to investigate whether oxidative stress is causally related to the development of metabolic disease and aging, and what modifiable risk factors (e.g., lifestyle and adiposity levels) contribute to higher oxidative stress levels. Based on epidemiological studies planned for this project, we will establish a greater understanding of the causes and health consequences of oxidative stress in the general population.

8. ZURICH LONGITUDINAL STUDIES: THE IMPORTANCE OF CHILDHOOD FOR HEALTHY AGING

Dr. Flavia Maria Wehrle, Child Development Center, University Children's Hospital, Zurich, Switzerland
CHF 483'000

Research increasingly suggests that health should be viewed from a lifespan perspective: Individual and environmental factors across development may contribute to healthy aging – this includes childhood health status, personality traits or socio-demographic variables. In this project, the former participants of the Zurich Longitudinal Studies – a unique set of studies covering physical, motor, mental and social development from birth into young adulthood – will be followed-up in mid-adulthood (age 45 years) and at the transition to old age (age 65 years). Comprehensive information on their current health status and well-being will be linked to their archived developmental data assessed during childhood and adolescence between 1950 and 1970. This provides the necessary database to identify factors in early life which contribute to health and well-being in older age.

9. TARGETING HIPPOCAMPAL HYPERACTIVITY THROUGH REAL-TIME FUNCTIONAL MRI BASED NEUROFEEDBACK IN ELDERLY INDIVIDUALS WITH AND WITHOUT MEMORY PROBLEMS

Dr. Jessica Peter, University Hospital of Old Age Psychiatry and Psychotherapy, University of Bern, Switzerland
CHF 395'000

The pathophysiological process of Alzheimer's disease (AD) begins many years prior to a clinical diagnosis. Functional MRI (fMRI) has the potential to detect early alterations in brain functions as well as directly modulate those activations with real-time fMRI-based neurofeedback. In this envisaged longitudinal randomized, placebo-controlled, and parallel-group study, healthy elderly adults as well as patients with preclinical AD (i.e., mild cognitive impairment) will train to willingly modulate activity in the hippocampus to counteract cognitive decline and maintain to live independently.

10. INSPIRE: IMPLEMENTATION OF AN INTEGRATED COMMUNITY-BASED CARE PROGRAM FOR SENIOR CITIZENS

Prof. Dr. Sabina De Geest, Nursing Science, University of Basel, Switzerland CHF 230'000

Healthy aging in the home setting is the preferred way of growing older. Yet, older adults suffering from multimorbidity often receive care by a large number of care providers, putting them at risk of fragmented care, leading to duplication of services, gaps in information delivery, conflicting care recommendations and higher costs. INSPIRE (Implementation of an integrated community-based care program for senior citizens) is responsive to the pressing need to show how integrated care models including promotion for healthy aging, social and health services can effectively be implemented.

The goals of INSPIRE are to:

- 1) develop and implement an integrated community care model for senior citizens in two care regions in Canton Baseland, and
- 2) evaluate the success of the implementation and the clinical effectiveness on senior citizen-, provider- and health systems level.

The developed integrated care model has the potential to be scaled up as stakeholder involvement is present throughout the project and in-depth process evaluations are conducted. The INSPIRE project can become a blueprint for other regions in CH and Europe to find innovative contextually adapted solutions for (healthy) aging.

11. AGEING WITHOUT AN ACHING SPINE: BIOMARKERS TO GUIDE TREATMENT OF MODIC CHANGES

Prof. Dr. Oliver Distler, Department of Rheumatology, University Hospital Zurich, Switzerland
CHF 400'000

Low back pain (LBP) is the world's most disabling condition worldwide and occurs more often in elderly. Vertebral bone marrow lesions – named Modic changes – coincide with LBP. Modic changes are caused by bacterial infection of the intervertebral disc or by an autoimmune reaction of the bone marrow against the disc. The correct treatment depends on the cause. Unfortunately, the cause cannot be determined noninvasively because there is no test available.

The goal of this project is to identify biomarkers that distinguish the two causes. This will allow non-surgical treatment before LBP becomes excruciating.

12. METRICS, MONITORING, RESEARCH AND KNOWLEDGE TRANSLATION FOR HEALTHY AGEING: FOSTERING IMPACT AND ACCOUNTABILITY IN COUNTRIES

Dr. Ritu Sadana, Department of Ageing and Life Course,
WHO, Geneva, Switzerland CHF 540'000

Populations around the world are rapidly ageing: longer lives offer opportunities if health is optimized and inequities reduced. Endorsed by the World Health Assembly, WHO's comprehensive response is to promote Healthy Ageing over the life course. For older adults, this does not mean disease free: it does mean to be and do what you value. However, insufficient research and translation of knowledge hamper impact at country level. Moreover, to promote Healthy Ageing within and across countries, proposed global standards need to be implemented and refined, comparative data analysed, and sustainable approaches to monitor levels and trends put in place. The second phase builds on the First Phase to refine measures and metrics to monitor progress on Healthy Ageing. The research will test operational standards, analyse new and existing data, develop interpretation norms, and document approaches for sustainable monitoring. These will be summarized in a tool kit.

13. UNDERSTANDING THE REASONS FOR DELAYED REFERRAL FOR DEBRIDEMENT, ANTIBIOTICS AND IMPLANT RETENTION (DAIR) IN PATIENTS WITH PERIPROSTHETIC JOINT INFECTIONS

Prof. Dr. Parham Sendi, Division of Infectious Diseases and Hospital Epidemiology, University Hospital Basel, Switzerland CHF 297'000

The risk of acquiring a periprosthetic joint infection (PJI) persists as long as the foreign implant is in place. The earlier that PJI is detected and referred to a specialised team, the less invasive the surgical procedure and the better the prognosis for joint mobility and cure of infection. A considerable number of individuals, older persons in

particular, are referred late. The aim of this project is to investigate the reasons for late referral by using quantitative and qualitative methods. The goal is to act against late referral of PJI, because it is associated with complicated surgery, prolonged antibiotic therapy and decreased quality of life.

14. DOES SOCIAL SUPPORT AVAILABILITY PROMOTE COGNITIVE FUNCTION IN MIDDLE- AND OLDER-AGED ADULTS?

Prof. Dr. Mark Oremus, School of Public Health and Health Systems, University of Waterloo, Canada
CHF 157'000 (CAD 206'000)

It will be examined whether social support availability affects cognitive function in middle- and older-aged adults. Social support availability is the extent to which individuals may draw upon other persons (family members, friends, neighbours, etc.) and communities (schools, churches, etc.) for help, care, and comfort in times of need. Cognitive function involves the mental processes (for example memory, reasoning, planning) that allow people to function in life. This work will suggest whether policies encouraging social support availability can benefit cognitive function and promote healthy aging in an era of aging populations.

15. GRIDCAGE – ALTERED GRID CODES AS A FUNDAMENTAL MECHANISM OF AGE-RELATED COGNITIVE DECLINE?

Prof. Dr. Thomas Wolbers, DZNE Magdeburg, German Center for Neurodegenerative Diseases (DZNE), Magdeburg, Germany
CHF 346'000 (EUR 299'000)

Declines in spatial navigation occur both during healthy and pathological ageing, and they can have substantial implications for episodic memory. To characterise the underlying neuronal and functional mechanisms of this decline, the GRIDCAGE project will investigate computational changes in the grid cell system – a central component of the brain's navigation circuit whose discovery was awarded the 2014 Nobel prize in Medicine. This ambitious goal will be achieved with an innovative combination of advanced virtual reality technology, ultra-high-resolution neuroimaging and the study of SuperAgers.

16. MICROBIOTA TRANSFER THERAPY TO TREAT
ALZHEIMER'S PATHOLOGY AND COGNITIVE
IMPAIRMENT IN TRANSGENIC MOUSE MODELS

Prof. Dr. Giovanni B. Frisoni, Centre de la mémoire, Geneva University Hospitals (HUG), Switzerland
CHF 156'000

It was shown that pro-inflammatory bacteria are over-represented in the gut of AD patients, and their abundance correlates with a peripheral pro-inflammatory profile. In mice, it was shown that Tg mice for AD do not develop the pathologic signature of the disease if raised germ-free. The aim of this project is to test the effect of the transplantation in AD transgenic mice of stools coming from humans protected from the development of AD. The readouts will be measures of AD pathology and cognitive impairment in mice.

17. HEALTHY AGING & SOCIAL COGNITION

Dr. Marc Sollberger, Memory Clinic, University of Basel, Switzerland
CHF 189'000

Current literature suggests that social cognitive skills might decrease in later life, likely reducing the quality of life of elderly people. However, no ecologically valid measures exist to measure social cognitive skills in (elderly) people reliably and in a timely way. The goal is to develop adequate clinical tools and to administer them to young and elderly healthy people i) to investigate the potential effect of aging on social cognitive skills and ii) to develop valid tools for later use in healthy (elderly) people and people with psychiatric and/or neurological disorders in clinical routine and research.

IV. OPHTHALMOLOGY RESEARCH

The foundation's goal to fund excellent research in ophthalmology is based on the fact that for most people vision is their most valued sense and helps us to enjoy independent lives.

APPROVED EXTERNAL PROJECTS IN 2018

18. CELL FUSION-MEDIATED THERAPY TO REGENERATE HUMAN RETINAE

Prof. Dr. Maria Pia Cosma, Center for Genomic Regulation (CRG), Barcelona, Spain
CHF 282'000 (EUR 246'000)

Retinitis Pigmentosa (RP) affects 1 in 3,500 individuals, who undergo progressive loss of vision and for which there is no cure. Regeneration of photoreceptors in RP mice and of ganglion and amacrine neurons in damaged mouse retinae is possible after cell-to-cell fusion of Wnt-activated bone marrow-derived stem cells transplanted in mouse retina. The project now aims to test the efficacy of this therapeutic approach in human retinae cultured in vitro. The study will investigate fusion of human adult stem cells with Müller glia cells and if the hybrids can differentiate in functional retinal neurons.

19. IMPROVING VISION IN ADULTS WITH MACULAR
DEGENERATION

Prof. Dr. Benjamin Thompson, Optometry and Vision Science,
University of Waterloo, Canada
CHF 206'000 (CAD 269'000)

Macular degeneration is a retinal disease that causes central vision loss and forces patients to use peripheral vision. Peripheral vision suffers from crowding, whereby adjacent objects or letters become jumbled together. This severely impairs reading. Visual training can improve peripheral vision. In addition, non-invasive neuro-modulation of the visual cortex may reduce crowding. The project has two goals: to assess whether neuro-modulation (1) improves vision and reading in macular degeneration and (2) enhances peripheral-reading training.

20. NOVEL COMPOUNDS FOR THE DIAGNOSIS AND
TREATMENT OF CORNEAL SCAR FORMATION

Prof. Dr. Simon Pot, Veterinary Ophthalmology Section,
University of Zurich, Switzerland
CHF 298'000

Corneal scar formation (fibrosis) is one of the major causes of preventable corneal blindness. Currently, there is a knowledge gap regarding corneal scar formation, especially regarding the disappearance of scar tissue cells from wound areas, and an unmet need for novel diagnostic and treatment strategies to address this common clinical problem. In this project, this unmet need will be addressed by adapting the use of novel diagnostic and therapeutic compounds to the evaluation of corneal wounds and the prevention of corneal scar formation.

21. PHARMACOLOGICAL STRATEGIES FOR MUTATION- INDEPENDENT TREATMENTS OF RETINITIS PIGMENTOSA

Prof. Dr. Enrica Strettoi, Italian National Research Council,
CNR Neuroscience Institute, Pisa, Italy
CHF 300'000 (EUR 261'000)

This project proposes to fill a gap in current knowledge of Retinitis Pigmentosa (RP) by devising a still missing pharmacological treatment which exploits the ability of new molecules to target inflammation and oxidative stress and delay the disease progression. Specifically, it is planned to slow down the secondary degeneration of retinal cones, which become exposed to a hostile microenvironment as a consequence of the primary process of rod death. By in vivo drug delivery to RP mice, inflammation and oxidative stress will be decreased, prolonging the lifetime of cones and the time window of useful vision.

V. MISCELLANEOUS

KNOWLEDGE TRANSFER

22. PROMOTING THE GOALS OF “TRANSPARENCY” AND “SOCIAL DISCOURSE”

Prof. Dr. Georg von Schnurbein, Center for Philanthropy
Studies (CEPS), University of Basel, Switzerland
CHF 100'000

The Center for Philanthropy Studies has developed to one of the leading institutes in Europe in the field of research and education in philanthropy. It provides important background data, research on the sector and timely education as well as an international network. Professionalism and transparency are important factors for acceptance of philanthropic activities by the public.

VI. SUMMARY OF ANNUAL CONTRIBUTIONS

This year 101 project applications or project outlines ('External projects') were submitted to the foundation. 86 applications and nine outlines were discussed of which 22 applications were funded by the board. The total amount of contributions was CHF 7'190'258.

	2018	2017	2016	2015	2014
External projects					
Daylight	2'213'190	2'140'160	1'287'185	728'800	1'096'500
Healthy Ageing	3'791'068	2'491'800	3'511'000	2'212'800	794'000
Ophthalmology	1'086'000	1'187'000	867'700	1'048'000	0
Medicine/Biology	0	0	0	210'000	400'000
Knowledge Transfer	100'000	0	0	0	0
Subtotal "External projects"	7'190'258	5'818'960	5'665'885	4'199'600	2'290'500
thereof					
Switzerland	4'149'028	3'977'900	3'376'485	2'486'600	1'930'500
International	3'041'230	1'841'060	2'289'400	1'713'000	360'000
Own projects					
Scientific workshops				80'000	100'000
Daylight Award					360'000
Daylight Academy			1'200'000	200'000	
Healthy Ageing		110'000	320'000		
Subtotal "Own projects"	0	110'000	1'520'000	280'000	460'000
Total	7'190'258	5'928'960	7'185'885	4'479'600	2'750'500

VII. THE FOUNDATION

Velux Stiftung is an independent charitable foundation supporting research projects in the areas of Daylight Research, Healthy Ageing Research and Ophthalmology Research. The foundation is active worldwide and supports innovative projects which generate lasting progress for the benefit of society.

Velux Stiftung was founded 1980 by Villum Kann Rasmussen, a Danish engineer. He was a pioneer and developed a novel window design with a pivot hinge in 1942 which made it possible to install windows in sloping roofs. He named his innovation "Velux" ("Ve" for ventilation, and "Lux" for light). It opened new architectural possibilities, bringing daylight and fresh air into buildings as well as transforming the dark attics of the post-war days into bright and comfortable rooms.

FOUNDATION BOARD

In 2018 the board of Velux Stiftung consisted of five members:

Ms Lykke Ogstrup Lunde, Chairwoman

Mr. Asger Høeg

Mr. Leif Jensen

Mr. Villum Ogstrup-Pedersen

Mr. René Schürmann

MANAGEMENT

The staff of the foundation increased with Ms Marion Bétizeau taking up a part-time position as Scientific Officer in January 2018. Ms Kirstin Kopp advanced to the position of Senior Scientific Officer.

Mr. Lukas von Orelli, Director

Ms Kirstin Kopp, Senior Scientific Officer

Ms Marion Bétizeau, Scientific Officer

Ms Beatrice Merkli, Back Office

Ms Lydia Moreno, Program Manager Daylight Academy

OPERATIONAL EXCELLENCE

a) Digitalization

In 2018 the foundation office advanced the digitalization of operations. One bottleneck for warranting a timely processing of the project applications is to identify suitable experts for the peer-reviewing process. As new technologies and more and more data shaped a very different research landscape in the last decade, the tools for discovering and linking research output has remained rather static. After evaluating two potential services, the foundation acquired a license for a linked-research platform. While the search for reviewers is greatly supported by this platform, it is still one of the most time-consuming steps in the project management process.

The other steps in the grant management process are currently handled by a dated grant management software. In order to identify the processes that can be digitalized in a sensible manner and to find an optimal solution without losing flexibility, the foundation enlisted the current IT-provider for consultation. The foundation office examined one provider in more detail who offers a broad solution with high flexibility and credibility, as well as high potential for being a long-term solution. The office will review additional alternative options for a grant management software in the beginning of 2019.

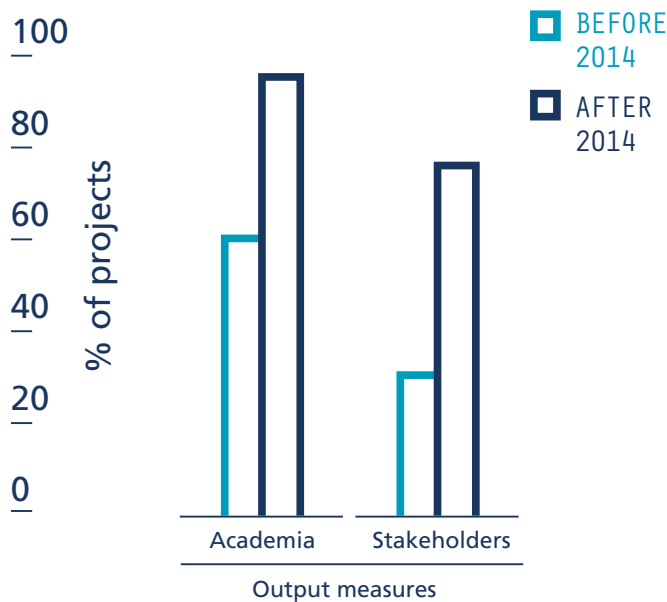
b) Evaluation of the Funding strategy

Five years ago, the foundation board decided to focus on supporting project which show efforts towards realizing the project's impact potential. These were defined as project applications with a relevant research question, that aim to cause change, and which want to spread the study results beyond the reach of a standard dissemination plan. This includes attracting attention from non-disciplinary communities and reaching out to stakeholders and the general public (if applicable).

In order to evaluate and visualize the transformation achieved by this strategic decision, the foundation office categorize the planned output measures (dissemination in academia, tools/services for the scientific community, knowledge dissemination to professionals/public, tools/services for the public) and their reach.

Before 2014, applications with output activities beyond a standard dissemination were not common. After 2014, the share of applications geared towards a stakeholder group increased by a factor of 2.5. Another comparison showed that in 2014 the external reviewers rated only half of the projects to have a high overall impact potential, while in 2017 2/3 of all applications were rated to have a high impact potential.

INCREASE IN OUTPUT MEASURES TO STAKEHOLDERS & PUBLIC



The evaluation also included an anonymized survey on how former applicants (supported and declined) judge the reputation and impact of the foundation. The call had a high overall response rate of 37% (N = 98) and many open comments were submitted. The survey showed that the information about the funding strategy is rated as easy to find and understand. The foundation was rated as innovative, accountable and transparent, as well as professional and responsive in its communication by the majority of respondents. Grantees reported that the foundation's support enabled starting new lines of research and collaboration with new and interdisciplinary partners. We also received valuable suggestions for improvement, some of which have already been implemented (templates for reporting) and others are still in the pipeline.

The results of the survey were communicated to all participants and are now available on the website.

c) General Data Protection Regulation

On 25 May 2016 the EU's new data privacy law came into effect. This new law also affects organizations outside the EU if an organization has connections to EU organizations or citizens. Because many applicants (PIs) and reviewers come from European countries, the new law affected the foundation in several ways:

- a confidentiality and a data protection clause was introduced into the application forms, the review requests and the funding agreements,
- a data and a cookie policy was published on the website (as well as on the website of the Daylight Academy),
- an official mailbox was opened in the EU for possible requests from EU authorities,
- some adaptations how data is used for communication activities.

Herewith the foundation fulfils all requirements of the European Data Protection law. The final step will be to adapt the Newsletters to the new regulation that the foundation can use this communication channel again.

The foundation was also an active participant at the Swiss Foundations' workshop on how the EU's new data privacy law affects funding foundations in Switzerland. Marion Bétizeau is now part of the working group "New Data Protection regulation and potential impact for foundations" to share best practices on this issue.

FINANCIALS

In line with its charitable purpose Velux Stiftung follows the ESG investment principles. Therefore, all investments must comply with the principles of the UN Global Compact, a United Nations initiative to encourage businesses worldwide to adopt sustainable and socially responsible policies in the areas of human rights, labour, the environment and anti-corruption. Furthermore until 2020 the foundation aims to be invested by 10% of its assets in climate-change-mitigating illiquid investments. By the end of 2018 already 7.8% have been committed.

Velux Stiftung pursues investments that have the potential to generate substantial and long-term total returns, in order to make grants according to its purpose in the long run. The foundation's assets are managed by carefully chosen asset managers that are selected by the investment committee. These investment managers are monitored and evaluated regularly.

A new private equity as well as an illiquid real estate investment have been committed. A European High Dividend fund was finally sold because of an ongoing breach of the ESG-policy in the previous years. With the figures by end of September the annual ESG-screening of the total investments has been executed. Only one bond in the CHF-bonds mandate breached the UN Global Compact principles and was sold immediately. The whole portfolio is now compliant with the policy.

INVESTMENT COMMITTEE IN 2018

Ms Lykke Ogstrup Lunde, Chairwoman of the foundation board

Mr. Leif Jensen, Member of the foundation board

Mr. Lukas von Orelli, Director of the foundation

Mr. Per Skovsted, Chief investment officer

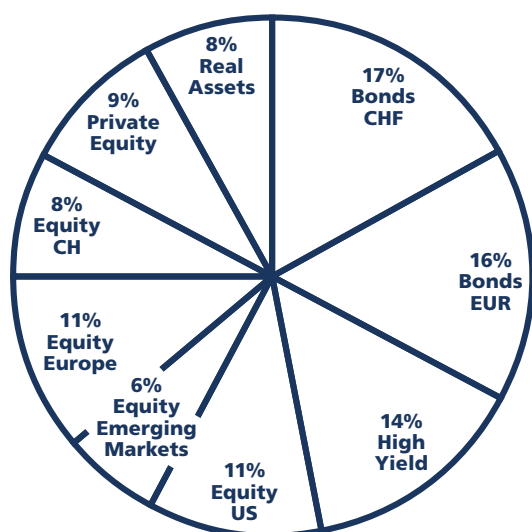
VELUX Foundations, Denmark

Mr. Thomas Overvad, Chief investment officer fixed income,

VELUX Foundations, Denmark

ASSET ALLOCATION

In 2018 the development of the financial markets led to a return on the foundation's total financial assets of -7.9%. By end of the year the total asset value was CHF 214 million.



ENGAGEMENT FOR THE PHILANTHROPIC SECTOR

Velux Stiftung continuously strives to improve itself and wants to take a role model for other grant-making foundations. The foundation wants to share how it pursues an impact-oriented funding approach, a competitive application procedure and the initiatives to create leverage with own projects and therefore engages in the philanthropic sector and disseminates know-how by reaching out through various activities.

Velux Stiftung takes an active part in the association of Swiss grant-making foundations, SwissFoundations (SF). As president of SwissFoundations, Lukas von Orelli was committed to represent the Swiss grant-making foundations towards the public and the authorities and the philanthropic sector, in Switzerland as well as abroad. In this function he gave an interview to the Basler Zeitung to explain the situation of grant-making foundations in Switzerland, gave a lecture at the Center for Philanthropy (CEPS) at the University of Basel about the challenges of the foundations.

As director of Velux Stiftung, Lukas von Orelli attended conferences and panel discussions in Switzerland and abroad to talk about the foundation's approach on impact investing.

In 2018, the foundation also became a partner with the a+ Swiss Platform Ageing Society, which is an initiative of the Swiss Academies of Arts and Sciences to ensure a continuous exchange of all stakeholders involved who work towards the Global Strategy and Action Plan on Ageing and Health delineated by the World Health Organization (WHO).

IMPRINT

Publisher:

VELUX STIFTUNG
Zum Rothen Adler
Kirchgasse 42
8001 Zurich
Switzerland

Contact:

Lukas von Orelli, Director

info@veluxstiftung.ch
Phone: +41 44 224 30 10
Fax: +41 44 224 30 11

Conception/Design

hilda design matters, Zurich

WWW.VELUXSTIFTUNG.CH