ARTIFICIAL VISION 2019

THE INTERNATIONAL SYMPOSIUM ON VISUAL PROSTHETICS

Friday, 13th – Saturday, 14th December, 2019

Aachen, Germany

FINAL PROGRAMME

Center for Technology
Aachen Europaplatz
www.artificial-vision.org

RWTH AACHEN UNIVERSITY | JÜLICH FORSCHUNGSZENTRUM

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The **Deutsche Forschungsgemeinschaft e.V.** will support the meeting with € 10.000,–

The financial support of these eight companies adds to the budget of Artificial Vision 2019 financing the costs of this conference, i.e. printing costs, postage, bank fees, rental costs of the congress venue, technical equipment, catering, travel expenses and accommodation for invited speakers, web design, insurances, certification fees, PCO etc.

ARTIFICIAL VISION 2019

AACHEN, AND THE EUREGIO AREA

The city of Aachen is the most western city in Germany close to the borders of The Netherlands and Belgium. Aachen has approx. 250,000 inhabitants and the University and the University Hospital are the largest employer here in Aachen. Aachen has a long history and you can still see significant witnesses of a time long ago, such as the cathedral with its beautiful and mystic octagon and the astonishing gothic city hall. But Aachen with its important historic phase of Charlemagne today is a young and vivid town with its university and the many students from various countries in the world. RWTH Aachen University is one of the leading technical universities in Europe with a strong focus on mechanical and electrical engineering but also on information technology and natural sciences. Aachen forms a cultural, industrial and also scientific cross border triangle together with Liege in Belgium and Maastricht in The Netherlands forming the EUREGIO area. Many cooperations exist between the institutions within this area.

The Artificial Vision Meeting is set to the mid of December. Although the weather might not be perfect – in fact it could be cold and maybe rainy – it is worth to visit the cosy Christmas Market in the city. You should try "Printen", a local biscuit speciality with a high "addiction" potential.

Aachen is also not far away from Cologne with its huge cathedral and its several concert halls and the province capital Düsseldorf with its important art and fashion scene. You can also reach the European capitals Paris and Brussels by high speed train within a few hours.

There are also many more reasons to come and visit Aachen and we are looking forward to see you.

The treatment of blindness caused by degenerative or dystrophic retinal diseases remains an unsolved medical but also social problem.
Although significant progress has been made, e.g. with the approval of the first gene therapy for RPE65 associated Leber's Congenital Amaurosis (LCA) on one hand or with the fabrication and implantation of retinal implant systems in RP patients on the other hand, there is still a bumpy road ahead.

Several years ago the implantation of retina implant systems sounded as a success story. Totally blind subjects were able to perceive light, to locate and avoid obstacles, some were even able to slowly read large letters and to identify high contrast objects. However, this success was not well recognized in the ophthalmic community and in the patient community. The number of implantations did not meet the expectations and calculations of the companies. As a result, e.g. Retina Implant AG stopped fabricating the Alpha AMS device and Second Sight also stopped their Argus II activities. Clinical results in a larger scale are now expected from trials with the subretinal photovoltaic device of PIXIUM and also from the cortical stimulation device ORION. Other activites are expected from the Australian and from the Japanese consortium and possibly also from other groups.

However, we learned a lot from the experiences with the early implants. Many research projects are still running to better understand the mechanisms of retinal degeneration, how to interfere with these mechanisms, what components of retinal or cortical implants can be improved or optimized to achieve a better outcome. New projects are planned to solve more general bottlenecks of retinal stimulation using implants.

The Artificial Vision 2019 Conference in Aachen, Germany serves as an interdisciplinary forum bringing together researchers of all disciplines involved in the design, planning, fabricating and testing of visual prostheses as well as scientists from the neurobiological world giving insights in the process of visual system degeneration. We also welcome the participation of patients in this conference to better understand their needs and expectations.

This conference is a fully open, non-invitational meeting. For young researchers we will have a number of travel grants available. The conference is supported by the German Research Association (Deutsche Forschungsgemeinschaft, DFG).

Together with my colleagues Wilfried Mokwa (RWTH), Frank Müller and Andreas Offenhäusser (RC Julich) I cordially invite you to come to Aachen.

Peter Walter
Department of Ophthalmology
University Hospital Aachen
RWTH Aachen University, Medical Faculty

Scientific programme and further information

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Organization

Congress-**O**rganisation **G**erling GmbH
Werftstraße 23, 40549 Düsseldorf, Germany
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E-Mail: info@congresse.de, Homepage: www.congresse.de

Venue

Center for Technology Aachen Europaplatz
Dennewartstraße 25-27
52068 Aachen, Germany

Lecture hall

Auditorium

Official Language

English

Date

Friday, December 13th, 2019 13:00 h – 18:15 h
Saturday, December 14th, 2019 08:15 h – 17:15 h

Opening hours congress office

Friday, December 13th, 2019 12:00 h – 18:15 h
Saturday, December 14th, 2019 07:45 h – 17:15 h

Opening hours industrial exhibition

Friday, December 13th, 2019 13:00 h – 18:15 h
Saturday, December 14th, 2019 08:15 h – 15:00 h

Homepage and Online Registration

www.artificial-vision.org

Hotel Booking

See hotel on the registration form
(or online www.artificial-vision.org)

ATTENDANCE FEE

Registration	After 30th September	On site
International symposium attendance fee	EUR 200,–	EUR 220,–
Reduced rate for PhD students and residents*	EUR 120,–	EUR 140,–

*PhD Students and residents must supply a letter of verification as proof of training. The letter has to be sent to the congress organization prior to the meeting.

The attendance fee covers the costs for coffee breaks, lunch, and the conference dinner (accompanying person EUR 50,–). Incl. VAT and excl. foreign transfer fees

Payment

by bank transfer (bank details are quoted on your confirmation and invoice. Please do not transfer money without noting your invoice number!), PayPal or by credit card: VISA, AMERICAN EXPRESS, MASTERCARD

Important notes for participants

The attendance fee covers the costs for coffee breaks, lunch, and the conference dinner. If you register late or on-site we cannot guarantee for lunch and participation in the social program.

You are encouraged to apply for the meeting either online, by mail or by fax. Cancellation for the symposium has to be made via e-mail or via fax (+49 (0) 2 11 / 59 35 60) by December 9th, 2019. In any case an administration fee of EUR 22,– has to be paid. After this date no refunds can be made.

Changes, errors and misprints excepted.

CME-POINTS

The Symposium is registered at the Ärztekammer Nordrhein providing CME-points for the German *Continuing Medical Education* System. Please bring your Barcode Labels and we will register you for CME-point documentation. An equivalent Certificate of Attendance will be given to you upon on-site registration.

INFORMATIONS FOR SPEAKERS

Presentations	Lecture	15 min presentation incl. discussion
	Talk	10 min presentation incl. discussion
Projection	Microsoft PowerPoint presentation on CD/DVD/USB-Stick or own notebook. video codecs: Quicktime 7.7.9®, Windows Media Player 12.0®	

Friday, 13th December, 2019

Conference Dinner

20:00 h **Schloss Rahe**
Schloss-Rahe-Straße 15, 52072 Aachen

Price per person (incl. dinner and drinks):

Participant	included in the attendance fee, but due to notification
Accompanying person	EUR 50,–
Bus transfer from the congress venue:	19:30 h
Return:	approx. 23:30 h

Friday, 13th December, 2019

13:00 h **Come Together**

14:00 h **Prof. Dr. med. Peter Walter**
(Department of Ophthalmology, RWTH Aachen University, Aachen/D)
Welcome Note

Univ.-Prof. Dr. rer. nat. Stefan Uhlig
(Dean of the Medical Faculty RWTH Aachen University)
Welcome Note

Dr.-Ing. Damian Dudek (German National Research Agency DFG)
Welcome Note

14:40 h **1st Session**
▼ **Retinal Degeneration – Models & Mechanisms**
16:00 h

Chair: **Frank Müller** (Juelich/D)
Günther Zeck (Tuebingen/D)

01 **Lecture** **Hamed Shabani**[1], M. Sadeghi[1], M. Hosseinzadeh[2], E. Zrenner[1], D.L. Rathbun[1]
14:15 h ([1]University Eye-Clinic Tuebingen/D, [2]University Eye-Clinic Leipzig/D)
MEA-based classification of retinal ganglion cells for bionic vision

02 **Talk** **Nicholas Hempel**[1], B. Denecke[2], J. Weis[3], F. Mueller[4], P. Walter[1], S. Johnen[1]
14:30 h ([1]Department of Ophthalmology, University Hospital RWTH Aachen/D, [2]Genomics Core Facility, Interdisciplinary Center for Clinical Research, University Hospital RWTH Aachen/D, [3]Institute of Neuropathology, University Hospital RWTH Aachen/D, [4]Institute of Complex Systems, Cellular Biophysics, ICS-4, Forschungszentrum Juelich/D)
Retinal transcriptome analysis of the rd10 mouse model of retinal degeneration

03 **Talk** **Alfred Yamoah**[1], H. Guo[1], P. Tripathi[1], I. Katona[1], P. Walter[2], S. Johnen[2], F. Müller[3], A. Goswami[1], J. Weis[1]
14:40 h ([1]Institute of Neuropathology RWTH Aachen University Medical School Aachen/D, [2]Department of Ophthalmology RWTH Aachen University Medical School Aachen/D, [3]Institute of Complex Systems Cellular Biophysics ICS-4 Forschungszentrum Jülich GmbH Juelich/D)
Altered autophagy and RNA binding proteins (RBPs) together with ER chaperones are linked to retinal degeneration in the rd10 mouse model of retinitis pigmentosa

04 **Lecture** **Seong-woo Kim**[1], K.-E. Choi[1], Y.S. Goo[2]
14:50 h ([1]Department of Ophthalmology, Korea University College of Medicine, Seoul/ROK, [2]Department of Physiology, Chungbuk National University School of Medicine, Cheongju/ROK)
Morphological findings of experimental pig models with outer retinal degeneration induced by intravitreal loading of Nmethyl-N-nitrosourea after vitrectomy

FRIDAY

05 **Lecture** **15:05 h**
Yong Sook Goo[1], S.-W. Kim[2]
([1]Chungbuk National University School of Medicine, Cheongju/ROK, [2]Korea University College of Medicine, Seoul/ROK)
Physiological findings of experimental pig models with outer retinal degeneration induced by intravitreal loading of Nmethyl-N-nitrosourea after vitrectomy

06 **Lecture** **15:20 h**
Jana Gehlen[1], S. Esser[1], K. Schaffrath[2], S. Johnen[2], P. Walter[2], F. Müller[1]
([1]Institute of Complex Systems, Cellular Biophysics, ICS-4, Forschungszentrum Juelich/D, [2]Department of Ophthalmology, University Hospital RWTH Aachen/D)
Towards an enhancement of prosthesis-based therapy in retinitis pigmentosa

07 **Lecture** **15:35 h**
Günther Zeck[1], A. Corna[1], P. Ramesh[2], J. H. Macke[2]
([1]Neurophysics, Natural and Medical Sciences Institute at the University Tuebingen/D, [2]Computational Neuroengineering, Department of Electrical and Computer Engineering, TU Munich/D)
Spatio-temporal resolution upon sinusoidal stimulation of ex vivo rd mouse retina

08 **Talk** **15:50 h**
Claudia Ingensiep, K. Schaffrath, P. Walter, S. Johnen
(Department of Ophthalmology, University Hospital RWTH Aachen/D)
A MEA-based hypoxia model for the analysis of electrical activity in murine retinae

16:00 h **Coffee break in the industrial exhibition**

16:30 h ▼ **18:15 h**
2nd Session
Technology of Visual Prosthetic Devices

Chair: **Marta J.I. Airaghi Leccardi** (Lausanne/CH)
Yasuo Terasawa (Gamagori/J)

09 **Lecture** **16:30 h**
Marta J.I. Airaghi Leccardi[1], N.A.L. Chenais[1], C.P.J. Vila[1], T.J. Wolfensberger[2], and D. Ghezzi[1]
([1]Medtronic Chair in Neuroengineering, Center for Neuroprosthetics and Institute of Bioengineering, School of Engineering, École polytechnique fédérale de Lausanne/CH, [2]Hôpital Ophtalmique Jules Gonin, Université de Lausanne/CH)
Development of a Foldable and Photovoltaic Wide-Field Epiretinal Prosthesis

10 **Lecture** **16:45 h**
Changhoon Baek, J. Kim, J. Yi, Y. Lee, J. Kim, H. Jeong, J. Seo
(National University Seoul/ROK)
Updates of Seoul Artificial Retina Project

11 **Lecture** **17:00 h**
Yasuo Terasawa[1,2], H. Tashiro[2,3], J. Ohta[2]
([1]Artificial Vision Institute, Nidek Co., Ltd, Gamagori/J, [2]Materials Science, Nara Institute of Science and Technology, [3]Department of Health Sciences, Kyushu University/J)
Suprachoroial retinal stimulation using temporally interfering electric fields: A simulation study

FRIDAY

12 **Lecture** **Sohee Kim**, H.W. Seo, N. Kim
17:15 h (Department of Robotics Engineering, Daegu Gyeongbuk Institute of Science and Technology (DGIST), Daegu/ROK)
Transparent 3D microelectrodes with high resolution for subretinal stimulation

13 **Lecture** **Kim Young-jin**, H. Jung, S.-A Lee
17:30 h (Osong Medical Innovation Foundation/ROK)
Development of reliable hybrid packaging technology for sub-retinal stimulation system

14 **Lecture** **Andreas Erbslöh**[1], R. Viga[1], K. Seidl[1,2], R. Kokozinski[1,2]
17:45 h ([1]University of Duisburg-Essen, Electronic Components and Circuits, Duisburg/D, [2]Fraunhofer Institute for Microelectronic Circuits and Systems, Duisburg/D)
Concept of a Retinal Closed-Loop System with an on-Chip Fire-Rate-Detection Algorithm

15 **Lecture** **Charles Yu**, V Fan, I Vieira
18:00 h (Stanford University, Palo Alto/USA)
Visual Prosthesis for Corneal Blindness

18:15 h **End of day I**

20:00 h **Conference dinner, Castle Rahe, Aachen**

FRIDAY

Saturday, 15th December, 2019

08:15 h ▼ 10:20 h — **3rd Session**

Preclinical data on stimulation and new devices

Chair: **Tibor K. Lohmann** (Aachen/D)
Takeshi Morimoto (Osaka/J)

16 **Lecture 08:15 h** — **Peter Stalmans** (Department of Ophthalmology, UZLeuven, Leuven/B)
Safety and performance clinical trial of the NR600 retinal implant in end-stage inherited outer retinal degenerative diseases

17 **Lecture 08:30 h** — **Mahmut E. Celik**[1], D. Nguyen[2], E. Scorsone[3], L. Rousseau[4], S. Picaud[2]
([1]Electrical and Electronics Engineering Department, Gazi University, Ankara/TR, [2]L'Institut de la Vision, Paris/F, [3]CEA Saclay, Paris, France, [4]ESIEE Paris/F)
Investigation of Spatial Selectivity using Blind Source Separation Algorithm for Electrical Retinal Stimulation

18 **Lecture 08:45 h** — **Naïg Chenais**, M.A. Leccardi, D. Ghezzi
(Swiss Federal Institute of Technology (EPFL), Medtronic Chair in Neuroengineering, Center for Neuroprosthetics, Geneva/CH)
Ex-vivo characterization of high-resolution photovoltaic epi-retinal stimulation

19 **Lecture 09:00 h** — **Viviana Rincón Montes**[1], J. Gehlen[2], K. Srikantharajah[1], F. Müller[2], A. Offenhäusser[1]
([1]Institute of Complex Systems – Bioelectronics (ICS-8) – Forschungszentrum Jülich/D, [2]Institute of Complex Systems – Cellular Biophysics (ICS-4) – Forschungszentrum Jülich/D)
Polymer-based penetrating probes for retinal applications

20 **Lecture 09:15 h** — **Paul Werginz**[1,3], V. Raghuram[2,3,4], S.I. Fried[2,3]
([1]Vienna University of Technology, Vienna/A, [2]Boston VA Healthcare System, Boston/USA, [3]Massachusetts General Hospital, Boston/USA, [4]Tufts University, Medford/USA)
Location-dependent AIS variations influence activation thresholds in mouse RGCs

21 **Talk 09:30 h** — **Tibor Karl Lohmann**[1], K. Schaffrath[1], S. Baumgarten[1], J. Seifert[1], P. Raffelberg[2] , F. Waschkowski[3], R. Viga2, R. Kokozinski[2,4], S. Johnen[1], W. Mokwa[3], P. Walter[1]
([1]Department of Ophtalmology, RWTH Aachen University Hospital, Aachen/D, [2]Electronic Components and Circuits, University of Duisburg-Essen, Duisburg/D, [3]Institute of Materials in Electrical Engineering 1, RWTH Aachen University, Aachen/D, [4]Fraunhofer Institute of Microelectronic Circuits and Systems, Duisburg/D)
Biocompatibility and surgical feasibility of the OPTO-EPIRET stimulation system

22 **Lecture 09:40 h** — **Takeshi Morimoto**[1], T. Miyoshi[2], T. Saitoh[3], K. Ito[3], M. Ozawa[3], K. Nishida[4], T. Fujikado[5]
([1]Dept. of Advanced Visual Neuroscience, Osaka University/J, [2]Dept. of Integrative physiology, Osaka University/J, [3]Nidek Co., Gamagori/J, [4]Dept. of Ophthalmology, Graduate School of Medicine, Osaka University/J, [5]Graduate School of Frontier Biosciences, Osaka University/J)
Feasibility of 3rd generation suprachoroidal–transretinal stimulation (STS) prosthesis in healthy dogs

SATURDAY

23 **Lecture** **09:55 h**

Vivien Gaillet[1], A. Cutrone[2], F. Artoni[2,3], P. Vagni[1], A.M. Pratiwi[1], S.A. Romero Pinto[1], D. Lipucci Di Paola[2], S. Micera[2,3], D. Ghezzi[1]
([1]Medtronic Chair in Neuroengineering, Center for Neuroprosthetics and Institute of Bioengineering, School of Engineering, École polytechnique fédérale de Lausanne, Geneva/CH, [2]The BioRobotics Institute, Scuola Superiore Sant'Anna, Piazza Martiri della Libertà , Pisa/I, [3]Bertarelli Foundation Chair in Translational Neuroengineering, Center for Neuroprosthetics and Institute of Bioengineering, School of Engineering, École polytechnique fédérale de Lausanne, Geneva/CH)
Electrical Stimulation of the Optic Nerve for Neuroprosthetic Applications

24 **Talk** **10:10 h**

Martina Kropp[1,2], D. Ghezzi[3], A. Conti[1,2], C. Jonescu-Cuypers[1], G. Thumann[1,2]
([1]Experimental Ophthalmology, University of Geneva, Geneva/CH, [2]Department of Ophthalmology, University Hospitals of Geneva, Geneva/CH, [3]Medtronic Chair in Neuroengineering, École polytechnique fédérale de Lausanne, Geneva/CH)
Surgical in vivo model in rabbits to test chronically self-opening intra-neural electrodes for optic nerve stimulation

10:20 h **Coffee break in the industrial exhibition**

10:50 h ▼ **12:20 h**

4th Session
Clinical Experiences with Retinal Stimulation and Implants

Chair: **Penelope J. Allen** (Melbourne/AUS)
Yannick Le Mer (Paris/F)

25 **Talk** **10:50 h**

Ronja Jung[1,2], K. Stingl[1], K. Stingl[2], C. Kelbsch[2], H. Wilhelm[1], T. Peters[1], B. Wilhelm[1], T. Strasser[1,2], P. Richter[1]
([1]Pupil Research Group, Center for Ophthalmology, University of Tuebingen, Tuebingen/D, [2]University Eye Hospital, Center for Ophthalmology, University of Tuebingen, Tuebingen/D)
Dynamics of pupillary responses to sinusoidal transcorneal electrostimulation in healthy subjects - Effects of stimulus frequency

26 **Lecture** **11:00 h**

David A.X. Nayagam[1,2], M.A. Petoe[1,3], S.A. Titchener[1,3], M. Kolic[4], E.K. Baglin[4], C.J. Abbott[4,5], C.D. Luu[4,5], S.B. Epp[1], P. Thien[1], J. Kvansakul[1,3], M.N. Shivdasani[6,1], W.G. Kentler[7], O. Burns[1], J. Villalobos[1], R. Millard[1], P. Seligman[1], J. Yeoh[4], R.J. Briggs[8], R.K. Shepherd[1,3], C.E. Williams[1,3], P.J. Allen[4,5]
([1]Bionics Institute, East Melbourne/AUS, [2]Department of Pathology, University of Melbourne, St. Vincent's Hospital, Melbourne/AUS, [3]Medical Bionics Department, University of Melbourne/AUS, [4]Centre for Eye Research Australia, Royal Victorian Eye and Ear Hospital,Melbourne/AUS, [5]Ophthalmology, Department of Surgery, University of Melbourne/AUS, [6]Graduate School of Biomedical Engineering, The University of New South Wales, Sydney/AUS, [7]Department of Biomedical Engineering, University of Melbourne, Melbourne/AUS, [8]Otolaryngology, Department of Surgery, University of Melbourne/AUS)
44-Channel Suprachoroidal Retinal Prosthesis Clinical Trial: Interim Device Status Update 1 Year Post-Implantation

SATURDAY

27 **Lecture** **11:15 h**

Penelope J. Allen[1,2], D.A.X. Nayagam[3,4], S.B. Epp[3], C.D. Luu[1,2], N. Barnes[7,8], M. Kolic[1], K. Young[1], E.K. Baglin[1], C.J. Abbott[1,2], R.J. Briggs[5], J. Yeoh[1], W.G. Kentler[6], S.A. Titchener[3], M.A. Petoe[3,4], C.E. Williams[3,4]
([1]Centre for Eye Research Australia, Royal Victorian Eye and Ear Hospital, Melbourne/AUS, [2]Department of Surgery (Ophthalmology), University of Melbourne/AUS, [3]Bionics Institute, Melbourne/AUS, [4]Medical Bionics Department, University of Melbourne/AUS, [5]Otolaryngology, University of Melbourne/AUS, [6]School of Engineering, University of Melbourne/AUS, [7]Data 61, Commonwealth Scientific and Industrial Research Organisation, Canberra/AUS, [8]The Australian National University, Canberra/AUS)
A suprachoroidal retinal prosthesis: surgical safety and stability

28 **Lecture** **11:30 h**

Caroline Van Cauwenbergh[1], D. Nerinckx[1], L Spielberg[1], L. Hebbelinck[1], A. Vandesteene[1], E. Van De Ginste[1], W. Schrauwen[2], I. Joniau[1], L. Wouters[1], B.P. Leroy[1]
([1]Department of Ophthalmology, Ghent University & Ghent University Hospital, Ghent/B, [2]Department of Medical Psychology, Ghent University Hospital, Ghent/B)
First Belgian Argus II retinal prosthesis implantation and rehabilitation: one-year outcomes

29 **Talk** **11:45 h**

Kim Schaffrath, T. Lohmann, S. Baumgarten, H. Schellhase, P. Walter (Department of Ophthalmology, University Hospital RWTH Aachen/D)
Management of surgery-associated adverse events of Argus II retinal prosthesis system

30 **Talk** **11:55 h**

Mahi M.K. Muqit[1,2], J.P. Hubschman[3], S. Picard[4], D.B. McCreery[5], J.C. van Meurs[6,7], C. Nouvel-Jaillard[4], C-M. Fovet[8], P. Hantraye[8], J. Sahel[4,9,10,11], J.N. Martel[10], Y. Le Mer[11]
([1]Vitreoretinal Service, Moorfields Eye Hospital, London/UK, [2]Institute of Ophthalmology, University College London/UK, [3]Stein Eye Institute, University of California Los Angeles/USA, [4]Sorbonne Université, INSERM, CNRS, Institut de la Vision; Paris/F, [5]Huntington Medical Research Institutes, Pasadena/USA, [6]Rotterdam Eye Hospital, Rotterdam/NL, [7]ErasmusMC, Rotterdam/NL, [8]Molecular Imaging Research Center (MIRCen), CEA, Fontenay aux Roses/F, [9]Hopital des Quinze Vingts, Paris/F, [10]Retina and Vitreous Service, University of Pittsburgh Medical School, Pittsburgh/USA, [11]Fondation Ophtalmologique A. De Rothschild, Paris/F)
Surgical technique of the PRIMA photovoltaic retinal implant: from animal testing to implantation in humans

31 **Lecture** **12:05 h**

Yannick Le Mer[1], S. Mohand-Saïd[2], M. Muqit[3], J. Sahel[4], D. Palanker[5] ([1]Fondation Ophtalmologique Rothschild, Paris/F, [2]CHNO des 15-20, Paris/F, [3]Moorfields Eye Hospital, London/UK, [4]Pittsburgh University/USA, [5]Stanford University/USA)
12 months results of first in human study, implanting the wireless subretinal PRIMA microchip in patients with dry AMD

12:20 h **Lunch break in the industrial exhibition**

SATURDAY

13:10 h **5th Session**
▼
14:30 h **Cortical Prosthesis: The next step?**

Chair: **Patrick Degenaar** (Newcastle/UK)
Shelley Fried (Boston/USA)

32 **Lecture** **13:10 h**
Patrick Degenaar, Y. Liu, A. Soltan
(Newcastle University, Newcastle upon Tyne/UK)
Newcastle Visual Cortical Prosthesis

33 **Talk** **13:25 h**
Yu Liu, P. Degenaar
(Newcastle University, Newcastle upon Tyne/UK)
The Newcastle Optogenetic Visual Cortical Prosthesis

34 **Lecture** **13:35 h**
Eduardo Fernandez
(University Miguel Hernández, Bioengineering Institute, Elche/E)
Development of a Cortical Visual Neuroprosthesis for the Blind: Preliminary results in human

35 **Lecture** **13:50 h**
Shelley Fried, S.W. Lee, S.B. Ryu
(Dept. of Neurosurgery, Massachusetts General Hospital, Boston/USA)
Towards the development of a micro-coil based cortical visual prosthesis

36 **Talk** **14:05 h**
Walter Gallo Gomez, Y. Pecho Trigueros
(Lima/PE)
Implantation of microchips in the relay neurons of the lateral geniculate nucleus

37 **Lecture** **14:15 h**
Katerina Eleonora K. Rassia[1], J.S. Pezaris[2,3]
([1]Cognitive Science Laboratory, Dept. of History and Philosophy of Science, National and Kapodistrian Univ. of Athens/GR, [2]Dept. of Neurosurgery, Massachusetts General Hospital, Boston/USA, [3]Dept. of Neurosurgery, Harvard Medical School, Boston/USA)
Improvement in reading performance through training with simulated thalamic visual prostheses

14:30 h **Coffee break in the industrial exhibition**

15:00 h **6th Session**
▼
16:20 h **Perception in Artificial Vision?**

Chair: **Gislin Dagnelie** (Baltimore/USA)
Stefan Pollmann (Magdeburg/D)

38 **Talk** **15:00 h**
Kazim Hilmi Or
(Hamburg)
A model of sight in artificial vision and some of its perception properties

SATURDAY

39 **Lecture** **15:10 h**

Penelope J. Allen[1,2], D.A.X. Nayagam[3,4], C.D. Luu[1,2], N. Barnes[7,8], M. Kolic[1], K. Young[1], E.K. Baglin[1], C.J. Abbott[1,2], R.J. Briggs[5], J. Yeoh[1], W.G. Kentler[6], J. Kvansakul[3], S.A. Titchener[3], M.A. Petoe[3,4], C.E. Williams[3,4]
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A suprachoroidal retinal prosthesis: initial functional results

40 **Talk** **15:25 h**

Samuel A. Titchener[1,2], M.A. Petoe[1,2], J. Kvansakul[1,2], M.N. Shivdasani[3,1], J.B. Fallon[1,2], D.A.X. Nayagam[1,4], S.B. Epp[1], C.E. Williams[1,2], N. Barnes[5,6], W.G. Kentler[7], M. Kolic[8], E.K. Baglin[8], C.J. Abbott[8,9], C.D. Luu[8,9], P.J. Allen[8,9]
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Perception of motion in a 2nd generation suprachoroidal retinal implant

41 **Lecture** **15:35 h**

Nadia Paraskevoudi[1,2], J.S. Pezaris[3,4]
([1]Brainlab – Cognitive Neuroscience Research Group, Department of Clinical Psychology and Psychobiology, University of Barcelona, Barcelona/E, [2]Inst. of Neurosciences, University of Barcelona, Barcelona/E, [3]Department of Neurosurgery, Massachusetts General Hospital, Boston/USA, [4]Department of Neurosurgery, Harvard Medical School, Boston/USA)
The effect of eye and head position on reading speed in a simulation of prosthetic vision

42 **Lecture** **15:50 h**

Stefan Pollmann, C. Nath, L. Wang
(Institute of Psychology, Otto-von-Guericke-Universität Magdeburg/D)
Object recognition training with simulated retina implant perception

43 **Lecture** **16:05 h**

Gislin Dagnelie[1], A. Kartha[1], R. Sadeghi[1,2], C. Bradley[1], D. Geruschat[1]
([1]Departments of Ophthalmology, Johns Hopkins University, Baltimore/USA, [2]Departments of Biomedical Engineering, Johns Hopkins University, Baltimore/USA)
Towards a unified set of performance outcomes for vision restoration trials

16:20 h **7th Session**
▼
16:50 h **Patients, Companies and Health Care Systems**

Chair: **Alfred Stett** (Reutlingen/D)
Ralf Hornig (Paris/F)

44 **Lecture**
16:20 h
Vasiliki Karadima[1], J.S. Pezaris[2,3]
([1]Multisensory and Temporal Processing Lab, Panteion University, Athens/GR, [2]Dept. of Neurosurgery, Massachusetts General Hospital, Boston/USA, [3]Dept. of Neurosurgery, Harvard Medical School, Boston/USA)
Potential users of visual prosthesis: expectations, motivation and attitudes towards participation

45 **Lecture**
16:35 h
Eberhart Zrenner[1], R. Rubow[2], A. Stett[3]
([1]Institute for Ophthalmic Research, Eberhard Karls Universität Tübingen/D, [2]Retina Implant AG i.L. Reutlingen/D, [3]Okuvision GmbH, Reutlingen/D)
The challenge to meet the expectations of patients, ophthalmologists and public health care systems with current retinal prostheses

16:50 h **Round Table – The Future of Visual Prosthetics**

17:15 h **Closure remarks – farewell reception**

SATURDAY

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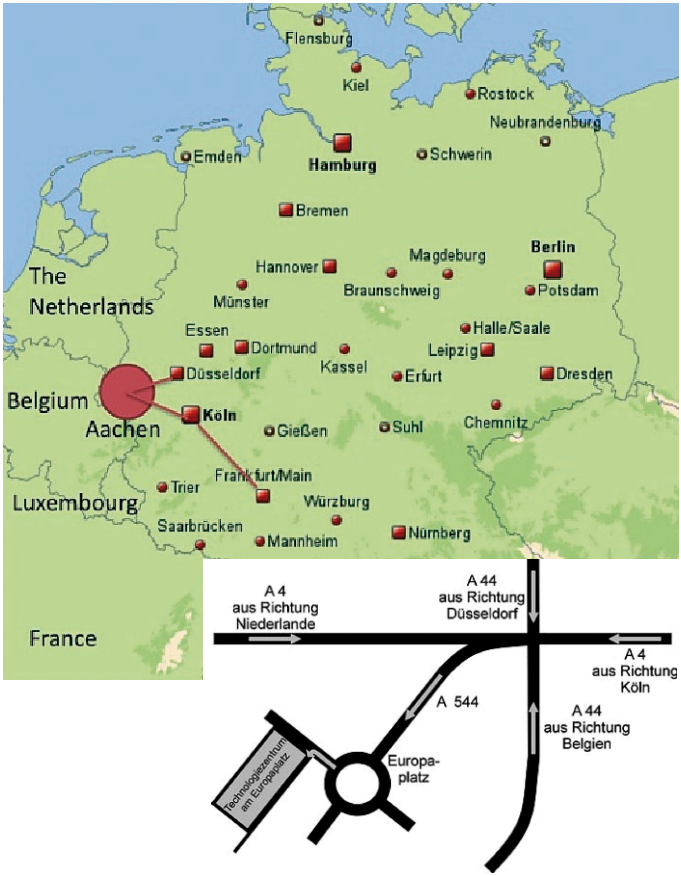

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13th – 14th DECEMBER, 2019
AACHEN, GERMANY

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