The 1st Hannover Cybernics & Neurobionics Summit 2024

12 January 2024

Starting at 11:00

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The 1st Hannover Cybernics & Neurobionics Summit is held in Hannover, the city of science and health care.

This Summit aspires to present cutting edge transdisciplinary translational solutions in Cybernics and Neurobionics to researchers, clinicians and industry and to discuss jointly the future direction of R&D and clinical implementation in this highly dynamic and unique field.

Welcome message

Welcome to the first Hannover Cybernics and Neurobionics Summit 2024

This focused one-day advanced international summit will allow a comprehensive experience and exchange on cutting edge developments in Cybernics and Neurobionics with world leading pioneers and experts.

The very exciting and growing field of Cybernics fuses human behavior, information systems, big-data, artificial intelligence and robots to support, regenerate and improve functional systems in the human body. Neurobionics uses electronic and information technologies to replace and connect artificially diseased areas of the nervous system. Cybernics and Neurobionics are driven by high-end technologies, interfacing with the human nervous system and thereby providing fundamental solutions to face both the expectation for quality of life of a super-aging society and to the realization of advanced brain-enhancement.

Some of the pioneering areas which will be presented and discussed will include neuroimplantation technologies, stimulation therapies for hearing impairment, pain, epilepsy and integrative medical approaches using Cybernics treatment for improving function in patients with neurological and neuromuscular diseases.

We are looking forward to welcoming you to The International Neuroscience Institute – Hannover for this summit on transdisciplinary translational solutions in Cybernics and Neurobionics with researchers, clinicians, industry and business partners discussing jointly the future of this highly dynamic field.

Amir Samii | Madjid Samii | Yoshiyuki Sankai

Schedule

10:30	Reception opens	
11:00	Welcome and Introduction to Cybernics and Neurobionics	Prof Amir Samii, M.D., Ph.D.
11:30	Neurobionics – the Hannover Perspective	Prof Madjid Samii, M.D., Ph.D.
12:00	Cybernics Medical and Healthcare Innovation making full use of Cybernics and Neurobionics	Prof Yoshiyuki Sankai, Ph.D.
12:40	Exoskeletal Robotic Rehabilitation for Spinal Cord Injury: Experience with an interactive Biofeedback (iBF) System	Prof Thomas Schildhauer, M.D., Ph.D.
13:10	Lunch break	
14:10	New frontiers in electrical and ultrasound neurotechnologies to control the brain and body towards better health	Prof Hubert Lim, Ph.D.
14:50	The Next Frontier in Neural Interfaces. Are we reaching an inflection point?	Prof Florian Solzbacher, Ph.D.
15:30	Clinical Practice and Exploration of Brain-Machine Interface in China	Prof Guoguang Zhao, M.D., Ph.D.
16:10	Tea & Coffee break	
16:30	Cybernics and Neurobionics of Hearing Restoration	Prof Thomas Lenarz, M.D., Ph.D.
17:10	Panel discussion on Cybernics and Neurobionics	Moderators: Prof Amir Samii; Prof Daniel Hänggi Panel: Prof Florian Solzbacher; Prof Guoguang Zhao; Prof Hubert Lim; Prof Thomas Lenarz; Prof Thomas Schildhauer; Prof Yoshiyuki Sankai
18:10	Closing remarks	

Host

Amir Samii

Vice President,
INI-Hannover and China-INI

Amir Samii has received his neurosurgical and neuroscience training at the Department of Neurosurgery at Charité - Humboldt University at Berlin, at the Brain Research Institute and Division of Neurosurgery at the University of California Los Angeles and at the Department of Neurosurgery at Nordstadt Hospital Hannover.
In 2003 he joined the International Neuroscience Institute – Hannover (INI) where he was nominated as Vice President and Deputy Medical Director of the INI-Hannover in 2008. Presently he serves also as Vice-President of China-INI, Beijing, Head of the "Intraoperative Mapping and Visualization of the Human Brain" Program at Leibniz Institute for Neurobiology-Magdeburg and as Professor of Neurosurgery at Hannover Medical School where he received the venia legendi for experimental neurosurgery at the age of 31. In 2001 he was one of the founders of the German Society for Computer- and Robotic-Assisted Surgery.
He has dedicated his early scientific work to the pathophysiology and neurometabolism of traumatic brain injury. During the last 25 years he has focused on the surgical integration and scientific evaluation of computer-assisted-surgery and intraoperative-visualization. Moreover, Prof. Samii has been working for the last 20 years in the field of innovative hearing restoration with neurobionic implants (auditory midbrain and auditory nerve implants).
Prof. Samii has served as member of the Administrative Council of the World Federation of Neurosurgical Societies (WFNS) from 2013 -2021 and was Chairman of the Neurosurgical Technology Committee of the WFNS 2007-2013. Prof. Samii has more than 250 publications and editorial functions in numerous journals.

Madjid Samii

President, INI-Hannover,
China-INI and INI-Iran

Madjid Samii became a professor of neurosurgery aged 33 at the University of Mainz. As a pioneer of modern micro neurosurgery, especially of nerve transplantation, he has earned the title 'father of skull base surgery' . To support research in biotechnical connections within central and peripheral nerve systems, Samii established the Neurobionics Foundation in 1990s. As WFNS President, Samii established the first foundation of WFNS dedicated to training doctors in underdeveloped countries, and was appointed WFNS Ambassador to Africa. Samii is currently President of the International Neuroscience Institute (INI) Hannover, China INI and INI Iran.
His major contribution for medicine was the introduction of micro neurosurgery in neurosurgery already in 1966 which was a turning point for modern neurosurgery. With his untiring distribution of his own discoveries through all over the world, he additionally has created and inaugurated a new surgical field in medicine as interdisciplinary Skull Base Surgery. With this new specialty now worldwide, every year thousands of patients who had no chance of treatment in the past, could be saved. For his contribution for development of the modern neurosurgery and for his unlimited effort for his educational programs for Neurosurgeons worldwide, he has received the many exceptional medals, awards and honors from all countries.

Yoshiyuki Sankai

Professor Department of Systems and Information Sciences, University of Tsukuba

President and CEO, CYBERDYNE Inc.

Yoshiyuki Sankai earned a Ph.D. in Engineering from University of Tsukuba in Japan in 1987. He has progressed from being a research fellow at the JSPS to assistant professor, associate professor, and then professor at the Graduate School of Systems and Information Engineering, University of Tsukuba. Dr. Sankai was also a visiting professor at Baylor College of Medicine in Houston, Texas, in the United States. Currently, he is a professor, the Executive Research Director at the Center for Cybernics Research and the Director at Research Center for Future Society Engineering Development,
F-MIRAI Center (established by Toyota) for the University of Tsukuba, the President and CEO of CYBERDYNE Inc., and a Program Director of cross-ministerial Strategic Innovation Promotion Program (SIP) for the Cabinet Office of the Government of Japan.
He has pioneered a new academic field, "Cybernics: the fusion and combination of humans, robots and information systems," best represented by the world's first Wearable Cyborg HAL. HAL is growing to be the new standard of treatment for many diseases, such as stroke, spinal cord injury, and neuromuscular diseases. As the concept of Cybernics cross-overs multiple academic fields, its founder, Sankai, is also an expert on a variety of topics. To name a few related to this event, his name appears in a journal on cell transplantation, 3D nanofibrous hydrogel, and collagen sponge scaffold.

Speaker/Panel

Daniel Hänggi

Director, Translational Neurosurgery at INI-Hannover

Daniel Hänggi is Director of Translational Neurosurgery at INI – International Neuroscience Institute® in Hannover, Germany. Before, he was Chairman of the Division of Neurosurgery at Düsseldorf University Hospital, Heinrich-Heine-University, Germany and Chairman of the Division of Neurosurgery at Mannheim University Medical Center, Germany. He is a neurosurgeon, scientist, researcher and a recognized expert on brain hemorrhage, including delayed cerebral ischemia (DCI) after subarachnoid hemorrhage, eloquent gliomas, skull-base tumors and minimal invasive spinal procedures. For the past 20 years, his research interest has focused on improving patient outcome after brain hemorrhage, with a specific focus on developing a cure for cerebral vasospasm and DCI. He has published over 300 peer-reviewed articles, authored and edited multiple textbooks, and has spoken at many international and national conferences. Additionally, Prof. Dr. Hänggi is an active member and expert of multiple international and national Neurosurgical- and Neurointensive Care Societies, in detail responsible for definition of guidelines, conducting international studies and teaching aspects. During his career, he received multiple national and international awards.

Florian Solzbacher

Endowed Professor and Chair, Department of Electrical and Computer Engineering and Director, Center for Engineering Innovation, The University of Utah

President and Executive Chairman, Blackrock Neurotech

Florian Solzbacher is the Gerald and Barbara Stringfellow Endowed Professor and Chair of the Department of Electrical and Computer Engineering. He also holds adjunct appointments as Professor in Materials Science and Professor of Biomedical Engineering at the University of Utah. He is a fellow of the American Institute for Medical and Biological Engineers AIMBE, a Fellow of the Institute of Electrical and Electronics Engineers IEEE and a Fellow of the National Academy of Inventors NAI. He is Co-Founder, President and Executive Chairman of Blackrock Microsystems/Neurotech. His research focuses on harsh environment microsystems and materials, including implantable, wireless microsystems for biomedical and healthcare applications, and on high temperature and harsh environment compatible micro sensors. He is co-founder of several companies and member of a number of company and public private partnership advisory and reviewer boards and conference steering committees in Europe and the US. He is author of over 200 journal and conference publications, five book chapters and 16 pending patents.

Guoguang Zhao

President, Xuanwu Hospital, Capital Medical University

President, National Center for Neurological Diseases

Director, China-INI

Vice Chairman, Congress of Chinese Neurological Surgeons

Guoguang Zhao, MD, PhD, serves as the President of Xuanwu Hospital, Capital Medical University. He earned his MD and PhD in Neurosurgery from Capital Medical University and underwent specialized training in Stereo-EEG and epilepsy surgery at the Claudio Munari Centre for Epilepsy, Niguarda Hospital in Milan, Italy, from 2003 to 2004.
Since 2015, Dr. Zhao has been a pioneer neurosurgeon in integrating brain network connectomics, multimodal imaging, and neuromodulation technologies. His groundbreaking work extends to the research and clinical application of brain-computer interfaces, such as deep brain stimulation, spinal cord stimulation, and responsive neurostimulation. In 2021, Dr. Zhao spearheaded the "Science and Technology Innovation 2030 - Brain Science and Brain-Like Intelligence Technology" project, securing substantial funding of 135 million RMB. Currently, he leads the fundamental research and clinical trial of implantable brain-computer interface surgical devices using in the neurological disorders. His outstanding contributions were recognized with the prestigious "First Prize of Chinese Medical Science and Technology Award" in 2022.
Dr. Zhao has held influential leadership roles, including Vice President of the Congress of Chinese Neurological Surgeons and positions in the Committee on Brain Function Research and Translation at the Chinese Research Hospital Association. He has also served as an Executive Member of the China Anti-Epilepsy Association. As a prolific researcher, Dr. Zhao has authored five books and contributed to 12 diagnostic guidelines and published over 100 peer-reviewed publications.
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Hubert Lim

Professor, Biomedical Engineering and Otolaryngology Departments, University of Minnesota

Hubert Lim is a Professor in the Biomedical Engineering and Otolaryngology Departments at the University of Minnesota and was hired as an Institute for Translational Neuroscience Scholar. He is also the Endowed Lions Professor in Otolaryngology and Co-Director for the Center for Neural Engineering. He completed a B.S.E. in Bioengineering at UC-San Diego, followed by a dual Masters in Biomedical Engineering and Electrical Engineering & Computer Science and then a Ph.D. in Biomedical Engineering at the University of Michigan. His lab's research focuses on medical devices, neuromodulation technologies, sensory neuroscience, neural plasticity, neuro-immune physiology, and integrative health approaches with the aim of translating new stimulation treatments for hearing disorders, pain and inflammatory conditions with multiple clinicians and companies. Dr. Lim has been awarded the Peter and Patricia Gruber International Research Award in Neuroscience from the Society for Neuroscience, the Institute for Engineering in Medicine Faculty Career Development Award, and the Institute for Engineering in Medicine Outstanding Service Award. He is also involved with two start-up companies, serving as the Chief Scientific Officer of Neuromod Devices (developing a tinnitus treatment device) and as the Chief Scientific Officer of SecondWave Systems (developing a wearable ultrasound device for treating various immune disorders).

Thomas Lenarz

Professor, Otorhinolaryngology and Chair of the Department of Otorhinolaryngology, Medical University of Hannover

Thomas Lenarz is distinguished by numerous contributions to hearing research, particularly in the field of auditory implants and audiology, the majority of which were developed at the Hannover Medical School (MHH), Department of Otolaryngology, which he has directed since 1993 and led to a world-class institution. He is known for important research in the fields of cochlear implants, newborn hearing screening, implantable hearing aids, biomaterials for medical implants, and audiobionics. Pioneering work was also done in the field of electroacoustic stimulation, local drug delivery in the cochlea, and central auditory prostheses. Lenarz developed the cochlear implant program in Hannover into the world's leading center. In 2003, the German Hearing Center Hannover was founded for integrated care of patients with hearing loss and for clinical research. In 2009, he opened the Collaborative Institute for Audio-Neurotechnology and Nano-Biomaterials Hannover (VIANNA). He is deputy speaker of the Cluster of Excellence "Hearing4all". Thomas Lenarz has authored more than 400 scientific publications and raised several million euros for projects. His activities have been recognized by prizes and numerous presidencies in various societies.

Thomas Schildhauer

Professor, BG University Hospital Bergmannsheil Bochum

Honorary Chair of the Board of Forum MedTechPharma e.V.

Thomas A. Schildhauer trained at the RWTH Aachen, and performed his doctorate at the Department of Physical Biochemistry and at the Fraunhofer Institute for Biomedical Engineering in St. Ingbert. International stays over seven years included training in Switzerland, South Africa and the USA (MetroHealth Medical Center, CWRU, Cleveland; USC Los Angeles; Cornell University New York), as well as a two year attending surgeon position at the Department of Orthopaedics, Harborview Medical Center, UW Seattle.

For about 16 years he worked at the Department of Surgery at Bergmannsheil Hospital Bochum. He then became Director of the Surgical-Traumatological Center, Asklepios Hospital St. Georg Hamburg (University of Hamburg and Semmelweis University Budapest, Hungary). In 2009 he became Professor and Chairman, Department of Trauma Surgery, University of Graz, Austria, and since 2010 he is Professor- and Chairman of the Department of General and Trauma Surgery at the BG-University Hospital 'Bergmannsheil' , Ruhr-University Bochum.

Between 2010 and 2022 he was Medical Director at 'Bergmannsheil' Bochum and between 2016 to 2019 he additionally took over the Medical Directorship at the BG-Trauma-Hospital in Duisburg. He was elected as Medical Director of the Executive Board of the University-Hospitals of the Ruhr-University Bochum between 2016 to 2020.

Since 2017 he serves as honorary Chair of the Board of Forum MedTechPharma e.V.

His research focuses on pelvic and spinal trauma, biomechanics, septic surgery, nerve regeneration and exoskeletal training in spinal cord injury. He is author of more than 320 peer-reviewed publications and numerous book chapters.