

brains in dialogue on deep brain stimulation a bid workshop

20-21 September 2010
Polonia Palace Hotel
Warsaw Poland

Contact person:
Dr Chiara Saviane - the bid team
SISSA - Trieste, Italy
Tel: +39 040 3787230
E-mail: saviane@sissa.it
www.neuromedia.eu

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Preliminary Agenda (tentative schedule)

Monday 20 September 2010

Potentials and limitations of DBS 11.00-18.00

Chairs: *Kerri Smith*; Nature magazine, UK
Michal Sobstyl; Postgraduate Medical Centre of Warsaw, Poland

Origin, evolution and perspectives of deep brain stimulation and cerebral neuromodulation: historical and bioethical aspects

Vittorio A. Sironi; University of Milano Bicocca, Italy

Singing the mind electric: Principles of deep brain stimulation

Morten L. Kringelbach; University of Oxford (UK) and Aarhus University (DK)

Title TBA

Jean-Luc Houeto; University of Poitier, France

Deep brain stimulation for treatment refractory psychiatric disorders - Early results, neuroethical implications and the way ahead

Thomas E. Schlaepfer; University Hospital Bonn (Germany) and The Johns Hopkins University (USA)

Tourette Syndrome: diagnostic and therapeutic algorithms to improve patient's quality of life

Mauro Porta; IRCCS Galeazzi and Policlinico San Marco, Italy

Title TBA

Reinhard Krickl; Medtronic International Trading Sàrl, Switzerland

Tuesday 21 September 2010

Social and ethical challenges 9.30-17.00

Chairs: *Franz Zeller*; Austrian Broadcasting Corporation, Austria
Thorsten Galert; Europäische Akademie GmbH, Germany

Ethical implications resulting from the increased use of DBS in mental disorders

Jens Kuhn; University of Cologne, Germany

Ethical issues in Deep Brain Stimulation

Maartje Schermer; Erasmus Medical Centre, The Netherlands

The "narrative" approach in bioethics

Helmut Dubiel; University of Giessen, Germany

Economic evaluation of deep brain stimulation versus best medical therapy in advanced Parkinson's disease: Results at 1 year

Emma McIntosh; University of Oxford, UK

Deep brain stimulation for neurological and psychiatric disorders: Sociological and anthropological issues

Baptiste Moutaud; Paris Descartes University, France

DBS: the role of the media in informing the public on scientific and ethical challenges

Daniela Ovadia; AgenziaZoe, Italy

Public round table: Brain, machine and something in between 18.00

Chair: *Marcin Rotkiewicz*; Polityka Magazine, Poland
Public event part of the **Warsaw Science Festival**.

Abstracts and background reading

Potentials and limitations of DBS

Origin, evolution and perspectives of deep brain stimulation and cerebral neuromodulation: historical and bioethical aspects

Vittorio A. Sironi; University of Milano Bicocca, Milan, Italy

In recent years, within the field of the functional neurosurgery a rapid change can be documented from the lesion techniques to the direct stimulation of brain target: *Cortical Brain Stimulation* (CBS) and *Deep Brain Stimulation* (DBS). In particular, DBS has let a development from an *irreversible lesion-based functional neurosurgery* to a *reversible stimulating functional neurosurgery*. Even if the use of the electric neurostimulation for diagnostic purposes (neurophysiologic experiences conducted by L. Rolando, R. Bartholow, E. Sciamanna, A. Alberti, G. Fritsh, E. Hitzig, C. Sherrington and W. Penfield) and for therapeutic aims (electric torpedoes used in antiquity for the treatment of headache, G. Duchenne's electrotherapy, the experiences on the pain conducted by R. Melzack and P. Wall, U. Cerletti's electroconvulsive therapy in psychiatric illness) isn't recent, only in the last decades clinical studies and trials were conducted showing the potential value of DBS. In detail, J.M. Delgado (1952), N.P. Bekhtereva (1963) e I.S. Cooper (1973) can be looked upon as the pioneers of this technique. Initiator and leader in the field of clinical neuromodulation through DBS in the treatment of motor disorders (Parkinson's disease, difficult-to-treat forms of dyskinesia) was A.L. Benabid in 1987. Today, clinical indications and therapeutic use of this technique are increasing (Tourette syndrome, cluster headache, severe psychosis), creating important technical (candidate selection, target identification, analysis of the results) and bioethical problems (informed consent, mind control, free will).

Background reading:

- Zago S, Ferrucci R, Fregni F, Priori A. (2008) Bartholow, Sciamanna, Alberti: Pioners in the Electrical Stimulation of the Exposed Human Cerebral Cortex. *Neuroscientist* 14:521-528.

Singing the mind electric: Principles of deep brain stimulation

Morten L. Kringelbach; University of Oxford (UK) and Aarhus University (DK)

The remarkable efficacy of deep brain stimulation for a range of treatment-resistant disorders is still not matched by a comparable understanding of the underlying neural mechanisms. Some progress has been made using translational research with a range of neuroscientific techniques and here we review the most promising emerging principles. On balance, deep brain stimulation appears to work by restoring normal oscillatory activity between a network of key brain regions. Further research using this causal neuromodulatory tool may provide vital insights into fundamental brain function, as well as guide targets for future treatments. In particular, deep brain stimulation could have an important role in restoring the balance of the brain's default network and thus repairing the malignant brain states associated with affective disorders which give rise to serious disabling problems such as anhedonia, the lack of

pleasure. At the same time, it is important to proceed with caution and not repeat the errors from the era of psychosurgery.

Background reading:

- Kringelbach ML (2009) *The pleasure center. Trust your animal instincts*. Oxford University Press.
- Kringelbach ML, Jenkinson N, Owen SLF, Aziz TZ (2007) Translational principles of deep brain stimulation. *Nature Reviews Neuroscience* 8: 623-635.
- Kringelbach ML and Aziz TZ. (2008) Sparking recovery with brain "pacemakers". *Scientific American Mind* 6: 36-43.

Deep brain stimulation for treatment refractory psychiatric disorders - Early results, neuroethical implications and the way ahead

Thomas E. Schlaepfer; University of Bonn (Germany) and The Johns Hopkins University (USA)

The main focus of studies on the underlying neurobiology of major depression concentrated for a long time on alterations on monoaminergic or endocrine systems. Whereas existing treatments approach this disease as a general brain dysfunction, a more complete and appropriate treatment might arise from conceptualizing depression as a dysfunction of specific brain networks that mediate mood and reward signals.

Deep brain stimulation (DBS) is a well-established procedure that refers to stereotactic placement of uni- or bilateral electrodes in a given brain region with electrodes connected to a neurostimulator implanted under the skin of the chest. It is a FDA approved method for control of severe forms of tremor in Parkinson's disease, essential tremor and primary dystonia. DBS is currently being researched actively for its as putative application in treatment resistant disorders like obsessive-compulsive disorder and major depression. Results from stimulation to different targets within the cortical–limbic–thalamic–striatal network have been recently presented in the last five years.

While early results are very promising - the use of an invasive neurosurgical treatment method in patients suffering from severe psychiatric disorders is correlated with specific ethical issues. A comprehensive ethical framework has to be developed in order to safeguard the development of this import treatment approach for severely ill patients.

Background reading:

- Schlaepfer TE and Bewernick B. (2009) Deep brain stimulation for psychiatric disorders-state of the art. *Advances and Technical Standards in Neurosurgery* 34: 37-57.
- Rabins P et al. (2009) Deep Brain Stimulation for Disorders of Mood, Behavior and Thought: Scientific and Ethical Issues. *Archives of General Psychiatry* 66(9): 931-7.
- Bewernick BH et al. (2010) Nucleus accumbens deep brain stimulation decreases ratings of depression and anxiety in treatment-resistant depression. *Biol Psychiatry* 67(2): 110-6.
- Schlaepfer TE and Fins JJ (2010) Deep Brain Stimulation and the Neuroethics of Responsible Publishing: When One is not Enough. *JAMA* 303(8): 775-6.

Tourette Syndrome: diagnostic and therapeutic algorithms to improve patient's quality of life

Mauro Porta; IRCCS Galeazzi and Policlinico San Marco, Italy

Tourette Syndrome (TS) is a complex and not so infrequent (3:1000) neurobehavioural disorder characterized by: i) variable pattern of motor tic and sound tic (not only vocal) ii) broadspectrum of behavioural patterns: problems with attention and learning, weak control of impulses, anxiety and mood disorders but mostly obsessive-compulsive disorders.

The clinical picture which starts before 18 years has a typical waxing and waning course with a freak severity in early teenage years, generally improving spontaneously in adulthood.

In few cases the symptoms persist all life long and a minority of patients has to be considered "refractory" to all the conservative therapies.

Even if the exact pathogenesis of TS is unknown, genetic and environmental factors (i.e.: streptococcus β -emolitic infection) play a role.

Subjects shows abnormal movements of the face, shoulders, extremities and they produce simple sounds (grunting, sniffing, throat cleaning) up to more complex vocalizations, repeating words or phrases and sometimes using blasphemies and/or obscenities. The behaviour is often altered.

All these symptoms modify patient's quality of life, who undergo very often to a significant social impairment.

Various conservative treatments are available: drugs, social intervention, habit reversal. Few patients refractory to non invasive therapy need Deep Brain Stimulation (DBS) to reduce their social impairment.

At the present time around 100 cases have been treated with DBS which represents a promising, mini-invasive, reversible technique.

Background reading:

- Porta M, Sassi M, Ali F, Cavanna AE, Servello D. (2009) Neurosurgical treatment for Gilles de la Tourette syndrome: the Italian perspective *J Psychosom Res* 67(6): 585-90.
- Porta M, Brambilla A, Cavanna AE, Servello D, Sassi M, Rickards H, Robertson MM. (2009) Thalamic deep brain stimulation for treatment refractory Tourette syndrome: two-year outcome. *Neurology* 73(17): 1375-80.
- Porta M, Servello D, Sassi M, Brambilla A, Defendi S, Priori A, Robertson M. (2009) Issues related to deep brain stimulation for treatment-refractory Tourette's syndrome. *Eur Neurol* 62(5): 264-73.
- Servello D, Sassi M, Brambilla A, Porta M, Haq I, Foote KD, Okun MS. (2009) De novo and rescue DBS leads for refractory Tourette syndrome patients with severe comorbid OCD: a multiple case report *J Neurol* 256(9): 1533-9.

Social and ethical challenges

Ethical issues in Deep Brain Stimulation

Maartje Schermer; Erasmus Medical Centre, The Netherlands

Deep Brain Stimulation (DBS), involving the implantation of electrodes into the brain, is currently an accepted treatment for neurological disorder such as Parkinson's disease. It is also being researched as treatment for psychiatric disorders like depression or Obsessive Compulsive Disorder, or addiction.

In this talk I will discuss some of the ethical issues that are raised by DBS.

Firstly, in the public perception, DBS may seem a scary or dangerous treatment. It evokes reminiscences of abuses of brain surgery in the past and plays into fears about mind control.

Second, in actual clinical practice, ethical issues concern the risks of the treatment, especially the effects on behaviour, personality traits and mental competence. How does DBS affect the patient's 'self'? Who is responsible for actions done under the influence of DBS? What about the effects of changed behaviour on family members?

Finally, in the context of research into new indications for DBS, there are some important research ethical issues. Do the expected benefits of experiments weigh up against the risks? How do we protect vulnerable research subjects? Might inflated hopes and commercial interests push towards irresponsible use of this new technology?

Background reading:

- Glannon W. (2009) Stimulating brains, altering minds. *Journal of Medical Ethics* 35: 289-292.
- Synofzik M and Schlaepfer TE. (2008) Stimulating personality: ethical criteria for deep brain stimulation in psychiatric patients for enhancement purposes. *Biotechnology Journal* 3: 1511-1520.
- Kuhn J, Gaebel W, Klosterkoetter J, Woopen C. (2009) Deep brain stimulation as a new therapeutic approach in therapy-resistant mental disorders: ethical aspects of investigational treatment. *Eur Arch Psychiatry Clin Neurosci* 259: S135-S141.

Ethical implications resulting from the increased use of DBS in mental disorders

Jens Kuhn; University of Cologne, Germany

Deep Brain Stimulation (DBS), which is already established as a treatment option for movement disorders, is also increasingly used in the psychiatric field. Besides the application of DBS in the treatment of serious depression, obsessive-compulsive disorder and Tourette Syndrome, first research projects are being conducted to examine the beneficial effects of DBS on addiction and dementia. There are also considerations to treat schizophrenic patients with this technique. Furthermore, the medical literature reports on single cases of the application of DBS for the treatment of obesity and minimally conscious state. Especially in the context of the latter mentioned indications ethical and legal questions arise. Aspects such as the ability to give informed consent have to be addressed intensively. Recently, the university hospital of Cologne, which focuses on the therapeutic exploration of DBS, initiated an interdisciplinary and binational project examining the ethical, legal and social aspects of DBS in the horizons of the concepts of health, quality of life and personal identity.

In the proposed lecture this project shall be introduced and an intermediate evaluation be given on the basis of first empirical data of DBS in M. Parkinson, obsessive-compulsive disorder and Tourette Syndrome.

Background reading:

- Kuhn J, Gaebel W, Klosterkoetter J, Woopen C. Deep Brain Stimulation as a New Therapeutic Approach in Therapy-resistant Mental Disorders: Ethical Aspects of investigational treatment. *Eur Arch Psychiatry Clin Neurosci* 2009; 259: S135-41
- Kuhn J, Gründler TJ, Lenartz D, Klosterkötter J, Sturm V, Huff W. (2010) Deep brain stimulation for psychiatric disorders. *Dtsch Arztebl Int* 107: 105-13.
- Schüpbach M et al. (2006) Neurosurgery in Parkinson disease: a distressed mind in a repaired body? *Neurology* 66(12): 1811-6.
- Synofzik M, Schlaepfer TE. (2008) Stimulating personality: ethical criteria for deep brain stimulation in psychiatric patients and for enhancement purposes. *Biotechnol J* 3(12): 1511-20.

The "narrative" approach in bioethics

Helmut Dubiel; University of Giessen, Germany

I will engage in the present debate of bioethics. I will argue that second order principles like "care" or "autonomy" cannot be detected in a quasi clinical neutrality. But that they have to be dealt with in a communicative way. The narrative access to physical experiences can be found in medical conditions like severe, chronic life threatening diseases. These diseases can be described as ruptures in the continuity of our autobiographical continuity....

Background reading:

- Dubiel H. (2009) *Deep In The Brain: Living With Parkinson's Disease*. Europa Editions.

Economic evaluation of deep brain stimulation versus best medical therapy in advanced Parkinson's disease: results at 1 year

Emma McIntosh, University of Oxford, UK

Surgical intervention for patients with advanced Parkinson's disease (PD) is an option once medical therapy fails to adequately control symptoms. In the UK's PDSURG trial patients with advanced PD were randomised between immediate surgery versus best medical therapy (with surgery deferred for at least one year). The primary endpoint for the economic evaluation is the EQ-5D measure. Detailed data on health care resources, social service use, formal care, informal care, productivity costs, government benefits and carer time were also collected. The incremental effectiveness, measured using the EQ-5D instrument will generate any Quality adjusted life years (QALYs) gained. The economic evaluation will follow the guidelines established by the National Institute for Health and Clinical Excellence (NICE) and the US panel on cost-effectiveness. To date the cost analysis at 1 year post randomisation has shown that, compared to medical therapy, in the surgery arm there is evidence of the following: higher health care costs; lower drug costs; lower informal care costs and reduced impact upon leisure time. However it is important to highlight that the higher health care costs in the surgical arm are driven by higher 'up front' surgical costs and that cost estimates will change over time as follow up continues. It is anticipated that the 'true' cost comparison will be around 3-5 years.

Background reading:

- McIntosh E, Gray A, Aziz T. (2003) The Cost of Subthalamic Stimulation for the Treatment of Advanced Parkinson's Disease. *Movement Disorders* 18(9): 993-99.
- Williams A et al. (2010) Deep brain stimulation plus best medical therapy versus best medical therapy alone for advanced Parkinson's disease (PD SURG trial): a randomised, open-label trial. *Lancet Neurol* 9(6):581-91.

Deep Brain Stimulation for neurological and psychiatric disorders: Sociological and anthropological issues.

Baptiste Moutaud; Paris Descartes University, France

As was the case for genetics at the end of the last century, neuroscience is becoming a new paradigm for understanding the mind, the body, the society and their relationships. Neuroscience therefore has epistemological, sociological and anthropological consequences on research and clinical practice, on the concept of humanness, on the definitions of disease and on the way subject's experience is apprehended. A new anthropological figure of modernity is appearing: a "cerebral subject" that is defined (and defines itself) by way of its cerebral functioning.

Since 1990, the development of Deep Brain Stimulation used for the treatment of various neurological disorders and psychiatric disorders has given empirical relevance to these questions. Thus DBS can be taken as an example of what I call "neuroscience in action" in clinical and therapeutic practice, confirming the shift from theory and research on brain activity to the development of efficient treatments for mental and neurological disorders. This technology, in empirical manner, has challenged first, the naturalization of mental processes; second, the relationships between neurology and psychiatry (linked by shared objectives in experimental research and patient care alike); and finally DBS has given us a means to study how and in what meaning neuroscience transforms the anthropological definition of the individual into a "cerebral" definition of individuality.

Background reading:

- Gisquet E. (2008) Cerebral implants and Parkinson's disease: A unique form of biographical disruption? *Social Science & Medicine* 67(11): 1847-51.
- Schüpbach M et al. (2006) Neurosurgery in Parkinson disease. A distressed mind in a repaired body? *Neurology* 66: 1811-1816.
- Vidal F. (2009) Brainhood, anthropological figure of modernity. *History of the Human Sciences* 22(1): 5-36.

DBS: the role of the media in informing the public on scientific and ethical challenges

Ovadia Daniela; Agency Zoe, Italy

Deep brain stimulation is an approved and effective treatment for motor disorders in Parkinson disease and essential tremor. It may also be effective in treating a number of psychiatric disorders including depression and obsessive-compulsive disorders. Although this, the ethical and social challenges of DBS need further examination and discussion, and emerging applications in psychiatry may complicate the ethical landscape.

What is the role of media in explaining such a new frontier in medicine? Some studies on media coverage of DBS achievements have demonstrated that articles often fail to

report important details on the results of clinical studies. Most of the articles also lack of explanation of the underlying principles and technologies and exaggerate benefits of innovative but experimental procedures. Journalists and science writers aren't the only responsible for this lack of information: scientists and doctors are not always aware of the ethical challenge of DBS, nor of the historical and social background of this technology.

Background reading:

- Mind and matter: ethical challenges of deep brain stimulation. Dana Foundation Events. <http://www.dana.org/events/detail.aspx?id=13860>
- The library of Congress Webcasts. Deep brain stimulation and other technologies. http://www.loc.gov/today/cyberlc/feature_wdesc.php?rec=3715
- Racine E, Waldman S, Palmour N, Risse D, Illes J. (2007) "Currents of hope": neurostimulation techniques in U.S. and U.K. print media. *Camb Q Healthc Ethics* 16(3): 312-6.
- Schlaepfer TE and Fins JJ. (2010) Deep Brain Stimulation and the Neuroethics of Responsible Publishing: When One Is Not Enough *JAMA* 303: 775-6

Biographies (in alphabetical order)

Helmut Dubiel; University of Giessen, Germany

Professor of sociology, retired in fall last year, because of Parkinson's disease (treated by DBS). From 1992 through 2009 he was Professor of sociology at the University of Giessen (Germany), from 1999 through 2003 guest professor at the NYU (New York University). He wrote several books on Critical Theory, Coping with the past and, more recently, several articles on bioethics.

Thorsten Galert; Europäische Akademie GmbH, Germany

Thorsten Galert studied philosophy and chemistry at the Universities of Marburg and Vienna (M.A. in 1997). He received his Ph.D. in philosophy at the Philipps-Universität Marburg (Germany) in 2004 with a thesis on animal pain, exploring fundamental problems of research in animal consciousness. Since 2004 Dr. Galert is member of the scientific staff of the Europäische Akademie GmbH which is devoted to the investigation and assessment of consequences of scientific and technological developments for individual human beings, society and the natural environment. His assignment is to coordinate interdisciplinary project groups dealing with novel neurotechnologies in general, pharmaceutical neuroenhancement and psychiatric applications of Deep Brain Stimulation in particular.

Morten L. Kringelbach; University of Oxford (UK) and Aarhus University (DK)

Professor Morten L. Kringelbach, D.Phil., is a prizewinning, highly-cited neuroscientist whose main focus is to understand the functional neuroanatomy of human pleasure using functional neurosurgery and neuroimaging. He is the Director of Hedonia: Trygfonden Research Group, which is a unique transnational research collaboration between Oxford and Aarhus universities. He was elected a fellow of the Association for Psychological Science, and is on the advisory board of Scientific American.

Jens Kuhn; University of Cologne, Germany

Dr Jens Kuhn pursued his medical studies at the University of Leuven as well as Cologne where he graduated in 2000. He completed his neurology as well as psychiatry residency at different Hospitals in Cologne. Since 2009 he is consultant for psychiatry at the University Hospital of Cologne and Head of the research group "Deep brain stimulation in psychiatric disorders". Dr. Kuhn is principal investigator of projects focusing on the therapeutic benefits of DBS in substance abuse and dementia. Furthermore he is subproject leader of the German research group '219' dealing with the translational aspects of DBS in obsessive compulsive disorder and Tourette Syndrome. In addition he is directly involved in the bi-national ELSA-project (Ethical legal and social aspects of DBS) founded by the German BMBF.

Emma McIntosh; University of Oxford, UK

Dr Emma McIntosh is based at the Health Economics Research Centre (HERC) at the University of Oxford. Emma has an MSc in Health Economics and a PhD in Economics. Emma's PhD was in the methodology of stated preference discrete choice methods in health economics. In addition to this Emma specializes in the methodology of economic evaluation alongside clinical trials and has worked on, and published research on, a large number of economic evaluations alongside trials. At HERC, Emma is working on clinical trials in Parkinson's disease, child and maternal anxiety and home visiting as well as teaching, supervising, examining and reviewing.

Baptiste Moutaud; Paris Descartes University, France

Baptiste Moutaud is currently a post-doctoral researcher in social anthropology at CERMES3 Research Centre at Paris Descartes University (France). His research interests are at the crossroads of medical anthropology and Science Studies. They focus on neuroscientific practices and their consequences on the definition of the individual from an anthropological standpoint. His dissertation based on an ethnographic study of a French neuroscientific

clinical centre at the Pitié-Salpêtrière Hospital (Paris) explored how Deep Brain Stimulation was experimentally applied to a psychiatric disorder (the obsessive compulsive disorder) in treatment resistant cases.

Daniela Ovidia; Agency Zoe, Italy

Daniela Ovidia is a scientific journalist. She started her career in 1992 writing for *Tempo Medico* and for some Italian dailies such as *Corriere della Sera* and *Sole 24 Ore*, newsmagazines such as *L'Espresso* and *Panorama* and for *Le Scienze* – *Scientific American*. She studied medicine at the Milan University and was fellow at Niguarda Hospital Neuropsychology Department. In 2002 founded the Agency Zoe for medical and scientific journalism, where she is currently scientific editor in chief. She authored a neuroscience textbook, "Neuroscience Biomag", for high school/college biology courses to be published in 2010 by Pearson Italia. She teaches scientific journalism in the Journalism Master Course in Padua University.

Mauro Porta; IRCCS Galeazzi and Policlinico San Marco, Italy

Mauro Porta is the chief neurologist at the Movement Disorders and Tourette Syndrome Centre of IRCCS Galeazzi in Milan and also at the Operational Unit of Policlinico San Marco in Zingonia (Bergamo). He has successfully achieved specializations in the discipline of Nervous Diseases and Neurosurgery. He transferred first to the United States and then to Paris, working at the "Salpêtrière" for a long period. This allowed him to come into contact with major experts in several fields, in particular to do with movement disturbances including tics, which precisely at the "Salpêtrière" were already being studied at the time of the renowned neurologist Charcot. His activities are reflected in about 200 scientific papers. He's Scientific Board Coordinator of the Italian Association for Tourette Syndrome.

Marcin Rotkiewicz; Polityka magazine, Poland

Marcin Rotkiewicz (b. 1972) - journalist with more than ten years experience of science journalism. He works for *Polityka*, the most influential newsweekly in Poland. Based in Warsaw, he covers a wide range of scientific fields – primates' evolution and social life, neuroscience, evolutionary psychology and biotechnology. Rotkiewicz earned a masters degree in journalism from the University of Warsaw but also pursued a course of study in philosophy. In 2008/09 he spent a full academic year at the Massachusetts Institute of Technology and Harvard University (Cambridge, USA) as a Knight Science Journalism Fellow. He is a member of Polish Science Journalists' Association.

Maartje Schermer; Erasmus Medical Centre, The Netherlands

Maartje Schermer, MD, PhD, is associate professor at the department of Medical Ethics and Philosophy of Medicine at the ErasmusMC in Rotterdam. She trained as a physician and philosopher, and wrote her thesis on the concept and practice of patient autonomy. She has published on a wide variety of subjects, like well-being and dementia care, pragmatist ethics, ethics of new and emerging technologies, telecare, neuroethics and enhancement. She was project leader of 'Botox for the brain', a research project on the ethics of psychopharmaceutical enhancement. Current research interests are wish-fulfilling medicine, anti-ageing medicine, enhancement and neuroethics.

Thomas E. Schlaepfer; University Hospital Bonn, Germany

Dr. Schlaepfer received his medical training at the University of Bern, Switzerland. He did his residency training in psychiatry at the University Hospital Bern and the Johns Hopkins University in Baltimore; at Johns Hopkins he did a fellowship in Psychiatric Neuroimaging. Since 2003 he is the Vice Chair of the Department of Psychiatry and Psychotherapy of the University of Bonn, Germany, since 2006 he is Dean of Medical Education at the University of Bonn. He has authored and co-authored over 100 articles in peer-reviewed journals; his areas of interest are brain stimulation methods in the treatment of refractory major depression and neuroimaging.

Vittorio A. Sironi; University of Milano Bicocca, Italy

Vittorio A. Sironi, neurosurgeon, historian and anthropologist, is scientific director of the Research Centre on the History of Biomedical Thought and Professor of History of Medicine at the University of Milano Bicocca in Milan (Italy). He is also vice-president of the International and Interdisciplinary Association on the Pharmaceutical Life Cycle and coordinator of the Study Group on the History of Neurosurgery in the Italian Society of Neurosurgery. Last books: *The irreverent brain: a history of the disease of thousand tics*, concerning the syndrome of Tourette, *The discovery of the brain*, concerning the history of neuroscience, and *The house of the soul*, concerning the relationship mind-brain.

Kerri Smith; Nature magazine, UK

Kerri Smith joined Nature in 2006 after completing an MSc in Science Communication at Imperial College London. She presents and produces a wide range of podcasts, including the flagship weekly show, the Nature Podcast, and the monthly NeuroPod. Before finding her way to Nature she was at the University of Oxford, where she took a degree in human sciences and an MSc in Neuroscience. She also writes news and features for Nature, mostly on neuroscience and biomedicine. In the past she has been a freelance contributor to various publications including New Scientist and The Times.

Franz Zeller; Austrian Broadcasting Corporation, Austria

Franz Zeller read German Literature at Salzburg University and finished his thesis on “Bestsellers” in 1996. In 1988 he started to work for the Austrian Broadcasting Corporation (radio and TV). As a science-journalist and presenter he is now responsible for programmes dealing mainly with the digital world (Matrix and Digital.Leben). He is also a crime writer. His first novel “Herzlos” was published in 2009.