REGISTRATION

Symposium
Cognitive Technical Systems in Health and Medicine

September 12th-13th, 2005
Nuremberg, Germany

Please send your registration via fax to
+49 (0) 69 - 96 31 52 13

Name .....

First Name .....

Institution/Company .....

Street .....

Zip code ..... City .....

Country .....

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VDE Membership No. .....

I hereby register for the above mentioned symposium as a

❒ Member*	180,00 EUR
❒ Non-member	230,00 EUR
❒ Speaker	free of charge

Catering is included in the fees. Cancellations will be fully invoiced unless a replacement is stated. We only accept cancellations in written form.

* Member of VDE or DGMP

GENERAL INFORMATION

Scientific Committee

Prof. E. G. Hahn	University Erlangen-Nürnberg Board member DGBMT
Prof. K.-P. Hoffmann	FhG-IBMT, St. Ingbert VDE Initiative MikroMedizin (IMM) IMM Working Group Neural Prostheses
Prof. J. Hornegger	University Erlangen-Nürnberg
Prof. T. Stieglitz	IMTEK Freiburg DGBMT Working Group Neural Prostheses

Organizer

The **DGBMT German Society for Biomedical Engineering within VDE** is an interdisciplinary, scientific society working at the interface between medicine, technology and science.

Main focus topics are on:

- Medical Communication and Information Technology
- Imaging and Diagnostic Systems
- Therapy Systems
- Medical and Bioengineering
- Applied Medical Engineering / Clinical Engineering

www.dgbmt.de

Co-Organizer

VDE Initiative MicroMedicine

www.vde-mikromedizin.de

Contact

DGBMT - Dr. Thomas Becks
Stresemannallee 15
60596 Frankfurt am Main, Germany
Phone +49 (0) 69 - 6308 208
E-Mail dgbmt@vde.com

www.bmt2005.de

Venue

Maritim Hotel Nürnberg
Frauentorgraben 11
90443 Nürnberg, Germany
Phone +49 (0) 911 - 23 63 - 0
E-Mail info.nur@maritim.de

DGBMT GERMAN SOCIETY FOR BIOMEDICAL ENGINEERING WITHIN VDE

Arbeitskreis Neuroprothetik

VDE Initiative MikroMedizin

VDE

INTRODUCTION

Cognitive Technical Systems in Health and Medicine

September 12th-13th, 2005
Nuremberg, Germany

Cognitive technical systems learn from experience, anticipate problems and act pro-actively. They are expected to be personal and persistent partners of people in the near future.

The theory of cognitive technical systems will make many application fields accessible to cognitive systems - especially in health-care and medicine. With the main focus on medical applications and on medical devices that compensate for physical or mental deficiencies of humans, this symposium addresses the characterization, definition, and discussion of basic properties of cognitive technical systems.

24 impulse presentations in seven sessions will give a detailed insight into the medical and technical state-of-the-art. They work as a starting point for open and intensive discussions. Results will lead to a **position paper Cognitive Technical Systems in Health and Medicine** which adresses the need for continuative scientific work and funding in this important field of research. The paper can then be used to attract national funding agencies or even the 7th Framework Program.

We will focus the potential of cognitive technical systems to change medical engineering and to introduce a new dimension of medical products.

Joachim Hornegger
Klaus-Peter Hoffmann

Monday, September 12th, 2005

09.30 Welcome Adresses
E. G. Hahn, Erlangen
J. Hornegger, Erlangen
K.-P. Hoffmann, St. Ingbert

10.00 Opportunities and Limitations of Self-Learning Systems
Session I.1: Technical Focus
Chair S. Leonhardt, Aachen

10.00 Technical Devices: Can They Learn?
J. Hornegger, Erlangen

10.10 Generic Features of Cognitive Technical Systems
U. Schmid, Bamberg

10.20 Multidisciplinary Engineering of Cognitive Technical Systems
K. Paetzold, H. Meerkamm, Erlangen

10.30 Discussion

11.30 Coffee break

12.00 Opportunities and Limitations of Self-Learning Systems
Session I.2: Medical Focus
Chair S. Leonhardt, Aachen

12.00 Needs Analysis and Validation of Technical Cognitive Systems: the Clinical-to-Ambulant Transfer Center
E.-G. Hahn, Erlangen

12.10 On the Optimal Data Representation in Computational Cognition
D. J. Strauss, Saarbrücken

12.20 Discussion

13.30 Lunch break

PROGRAM

14.30 Cognitive Systems in Daily Life
Session II.1: Technical Focus
Chair K.-R. Müller, Berlin

14.30 Robotic Approaches to Support Elderly People
W. Burgard, Freiburg

14.40 Speech Recognition in Real-Life Application
F. Gallwitz, Erlangen

14.50 Discussion

16.00 Coffee break

16.30 Cognitive Systems in Daily Life
Session II.2: Medical Focus
Chair K.-R. Müller, Berlin

16.30 Activities of Daily Living and its Implications for Cognitive Technical Systems
E. Gräßel, H. Erzigkeit, Erlangen

16.40 Requirements of Daily-Life Equipment Adapted for the Elderly
J. Myllymäki-Neuhoff, Nürnberg

16.50 Early and Differential Diagnosis of Alzheimer's Dementia
J. Wiltfang, Erlangen

17.00 Discussion

18.00 End of day I

18.15 Get Together

PROGRAM

Tuesday, September 13th, 2005

09.00 Cognitive Technical Systems for Manifest Diseases and as Replacements of Body Functions
Session III.1: Technical Focus
Chair T. Stieglitz, Freiburg

09.00 Trends in Neuroprosthetics
K.-P. Hoffmann, St. Ingbert

09.10 Potentials and Limits of Implantable Central and Peripheral Neural Interfaces for the Control of Robotic Systems
S. Micera, Pisa, Italy

09.20 The Berlin Brain Computer Interface - Physiological Basis and Perspectives for Applications
G. Curio, Berlin

09.30 Brain Computer Interfaces - Signal Processing
U. G. Hofmann, Lübeck

09.40 Involuntary Motor Activity Evoked by Music Perception
J. Haueisen, Jena

09.50 Recent Developments in Hearing Aids
J. Binder, Erlangen

10.00 Discussion

10.30 Coffee break

11.00 Cognitive Technical Systems for Manifest Diseases and as Replacements of Body Functions
Session III.2: Medical Focus
Chair T. Stieglitz, Freiburg

11.00 Predicatable Social and Ethical Consequences of the Cognitive Technical Systems in Health Care
S. Rosahl, Freiburg

PROGRAM

11.10 Design of a Cortical Neuroprostheses
E. Fernandez, Alicante, Spain

11.20 Auditory Prostheses-Restoration of Auditory Functions
T. Lenarz, Hannover

11.30 Intelligent Hearing Aids I
U. Eysholdt, Erlangen

11.40 Intelligent Hearing Aids II
U. Hoppe, Erlangen

11.50 Discussion

12.30 Cognitive Technical Systems in Health and Medicine
Session IV: Summary
Chair J. Hornegger, Erlangen; K.-P. Hoffmann, St. Ingbert

12.30 Opportunities and Limitations of Self-Learning Systems
S. Leonhardt, Aachen

12.40 Cognitive Systems in Daily Life
K.-R. Müller, Berlin

12.50 Cognitive Technical Systems for Manifest Diseases and as Replacements of Body Functions
T. Stieglitz, Freiburg

13.00 Discussion and first draft of a position paper

14.00 End of symposium

DISCUSSION TOPICS

Session I — Opportunities and Limitations of Self-Learning Systems

- Do optimizing and tarpaulins of processes learn automatically?
- Self-learning systems, utopia or attainable aim?
- Existing attempts to study automatically permit the realization of cognitive systems.
- Is a technical system a cognitive technical system?
- Cognitive technical systems must be investigated and developed in a narrow dependence at man.
- Is there "the" representation of knowledge?
- Understand studying (learn how to learn).
- Self organization and complexity of technically cognitive systems.

Session II — Cognitive Systems in Daily Life

- Machines must be able to recognize emotions and to react to it.
- Future technical systems must be equipped with cognitive abilities and using interfaces to guarantee the serviceability of the complex systems.
- Future technical systems must adapt to man.
- Design of the man machine interface including questions of the control about voice communication and visual contact.
- Dialogue capable advertisement, terminal etc.
- Communication without traditional barriers of culture and language.
- Syntax, semantics and pragmatics of visual language.

Session III — Cognitive Technical Systems for Manifest Diseases and as Replacements of Body Functions

- Intelligent materials.
- Intelligent controls and particularly regulations . (Closed Loop Systems) are the future in the prosthetics.
- Humane computer interface: communication with technical systems.
- Ranges of application of neuroprostheses to the overcoming of neural disturbances.
- How far shall and can be improved functions of biological systems by neuroprostheses?
- Bio hybrid approaches with the cultivation of single cells in silicon micro systems or the release of biologically active substances.
- Cognitive technical systems for diagnostics, therapy and rehabilitation.
- Smart pills.
- GPS integrated long time monitoring of vigorous parameters among risk patients and persons in need of care and attention.
- Should assistive equipment and neuroprostheses help to overcome also cognitive and emotional defects?
- Neuroprostheses at a bimolecular level.
- Lead cognitive technical systems to a completely new equipment generation in the medical engineering?