EU FP7 FET Proactive - 258063

WorkPackage WP1: Community

Deliverable D1.3: European HCC Map

V1

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EXECUTIVE SUMMARY

The HCC Map attempts to charcterise the field of Human Computer Confluence. It is primarily about people but also identifies the relevant research areas, projects, funding opportunities and companies in this admittedly broad field.
It is an open-ended undertaking that we will build on throughout the course of HC^2.
In this first edition we list our take on the relevant research topics and some of the key players in those fields.

Deliverable Identification Sheet

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1 INTRODUCTION

In this document we aim to draw a map of the Human Computer Confluence research ecosystem in Europe. By this we mean the people, the communities, the research disciplines, the research themes, the projects, the companies and the funding initiatives.

There are 2 concrete goals:

- To identify those working in relevant areas so that we can invite them to participate interact in HC^2.
- To identify potential synergies across Europe in terms of research and funding.

The document shall remain open throughout the project and be updated as we collect new information.

In this first version we provide a map of research themes and those working in each one hyperlinked to a list of key HCC researchers.

We also provide a preliminary list of EU projects, companies and funding agencies related to HCC.

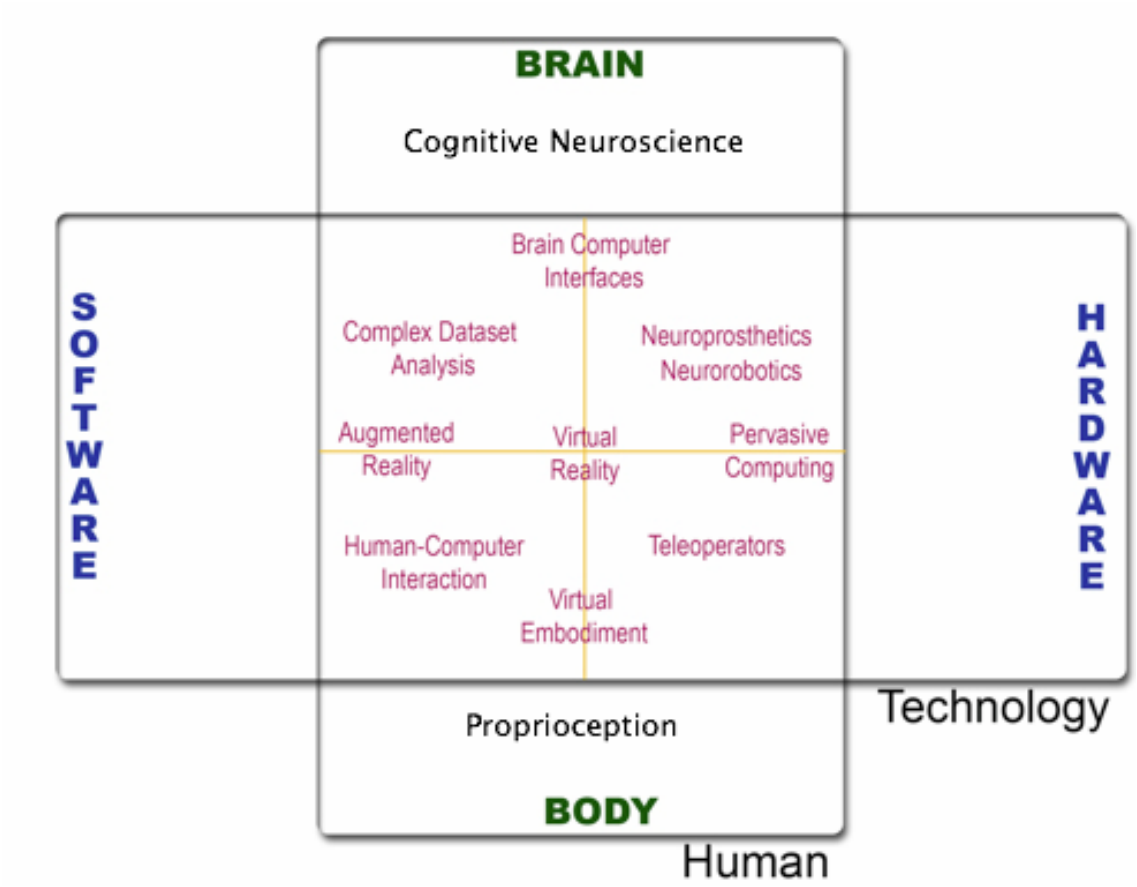

Figure 1 HCC research themes

In Figure 1 HCC research themes we attempt to illustrate the many research topics that intersect in HCC. There are a number of ways to look at this network of research and here we present the intersection of “Human” and “Technology” with Virtual Reality at its centre. The overlap implies the trend towards transparent bidirectional technology where our actions are mediated without conscious intervention on our part and all that this entails. It also implies that the barriers between virtual and real become fuzzy. This tendency to transparency raises questions about the very notion of interface.
The aim of HCC is to explore the limits of what can be done once this interface disappears and the barriers between real and virtual come down.
Another point of view is to consider experience; HCC research looks at new ways to experience reality. Such as:

- Re-experiencing oneself
- Experience being others
- Experience being together in more powerful ways
- Experience other environments
- Experience new senses
- Experience abstract data spaces

2 RESEARCH DISCIPLINES

The following categories have been selected based on our initial understanding of what HCC means for the community and the research interests of those working closely with FET HCC projects. It is not complete or final and will be updated as the project and community grows.

The categories have been populated with links to those researchers working in that field.

2.1 Acoustic Interfaces

Dr. Aleksander Väljamäe

Prof. Chris Raymaekers

Dr. Isabelle Viaud-Delmon

Dr. Narcís Pares

2.2 Artificial Intelligence

Prof. Antonio Kruger

Dr. Bruno Herbelin

Prof. Gerhard Widmer

Dr. Narcís Pares

Prof. Thomas Metzinger

Prof. Alberto Sanfeliu

2.3 Augmented and Mixed Reality

Prof. Antonio Kruger

Dr. Brian F. Goldiez

Dr. Elaine M. Huang

Prof. Elisabeth Andre

Prof. Giorgio De Michelis

Prof. Joe Paradiso

Prof. Mel Slater

Prof. Miriam Reiner

Prof. Peter Robinson

Mr. Renato Pellegrini

Mr. Steffen Mader

2.4 Brain Computer Interface (BCI)

Dr. Aleksander Väljamäe

Dr. Aureli Soria-Frisch

Dr. Brendan Allison

Dr Christoph Guger

Dr. Giulio Ruffini

Prof. Niels Birbaumer

Dr. Maria Victoria Sanchez Vives

Prof. Mel Slater

2.5 Brain Stimulation

Dr. Giulio Ruffini

Prof. Niels Birbaumer

2.6 Clinical Psychology

Prof. Stephane Bouchard

2.7 Cognitive Science/Neuroscience

Dr. Aleksander Väljamäe

Dr. Annie Luciani

Prof. Antonio Kruger

Mr. Christian Peter

Dr. Isabelle Viaud-Delmon

Prof. John Alexander Waterworth

Dr. Josh Bongart

Dr. Luciano Gamberini

Dr. Marc Ernst

Prof. Miriam Reiner

Dr. Narcís Pares

Prof. Olaf Blanke

Prof. Paul Verschure

Prof. Patrick Haggard

Prof. Salvatore Maria Aglioti

Dr. Sid Kouider

Prof. Stephane Bouchard

Prof. Thomas Metzinger

2.8 Communication Science

Prof. Adrian David Cheok

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Prof. Joe Paradiso

Dr. Luciano Gamberini

Dr. Narcís Pares

Prof. Paul Verschure

Dr. Ralph Schroeder

2.9 Communication Technologies

Mr. Gianluca Zaffiro

Prof. Giorgio De Michelis

Prof. Igor Pandzic

Dr. Ilona Heldal

2.10 Computer Graphics

Prof. Adrian David Cheok

Dr. Antonia Lucinelma Pessoa

Prof. Antonio Kruger

Dr. Bruno Herbelin

Dr. Franco Tecchia

Prof. Igor Pandzic

Dr. Jörg Voskamp

Dr. Mariano Alcañiz

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2.11 Computer Vision

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Dr. Martin Buss

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2.12 Education/Training

Prof. Tassos A. Mikropoulos

Prof. Miriam Reiner

2.13 Ethics and Legal

Dr. Barnabas Takacs

Prof. Patrick Haggard

Prof. Thomas Metzinger

2.14 Haptic Interfaces

Prof Abderrahmane Kheddar

Dr-Ing Angelika Peer

Dr. Annie Luciani

Dr. Antonio Frisoli

Prof. Chris Raymaekers

Dr. Manuel Ferre Perez

Prof. Massimo Bergamasco

Prof. Miriam Reiner

2.15 Human Computer Interaction

Prof. Adrian David Cheok

Prof. Albrecht Schmidt

Dr. Barnabas Takacs

Mr. Christian Peter

Prof. Chris Raymaekers

Prof. David Benyon

Dr. Elaine M. Huang

Dr. Giulio Ruffini

Dr. Henriette Cramer

Prof. Joe Paradiso

Dr. Jörg Voskamp

Dr. Luciano Gamberini

Dr. Manuel Ferre Perez

Prof. Peter Robinson

Dr. Randolf Schultz

Dr. Shwetak Patel

Mr. Steffen Mader

Dr. Verónica Costa Orvalho

2.16 Interactive media art

Prof. Adrian David Cheok

Dr. Annie Luciani

Prof. Giorgio De Michelis

Prof. Giulio Jacucci

Dr. Narcís Pares

2.17 Internet of Things

Prof. Alois Ferscha

Prof. Joe Paradiso

Prof. Paul Lukowicz

2.18 Neuroprosthetics

Prof. José del R. Millán

2.19 Neuropsychology

Prof. Olaf Blanke

Prof. Pietro Pietrini

2.20 New Media

Dr. Antonia Lucinelma Pessoa

Prof. David Benyon

Dr. Ilona Heldal

Dr. Jonathan Freeman

Dr. Ralph Schroeder

2.21 Pervasive Computing

Prof. Albrecht Schmidt

Prof. Alois Ferscha

Prof. Antonio Kruger

Prof. Elisabeth Andre

Prof. Joe Paradiso

Prof. Paul Lukowicz

Prof. Roger M. Whitaker

Prof. Yvonne Rogers

2.22 Philosophy

Prof. Jürgen Jost

Prof. Thomas Metzinger

2.23 Quantitative Self

Dr. Andrea Gaggioli

2.24 Sensor Networks

Prof. Joe Paradiso

Prof. Paul Lukowicz

2.25 Signal Processing

Dr. Giulio Ruffini

2.26 Social Psychology

Dr. Bruno Herbelin

Prof. Giorgio De Michelis

Dr. Henriette Cramer

Dr. Ilona Heldal

Prof. Jürgen Jost

Dr. Luciano Gamberini

Prof. Mel Slater

Prof. Niels Birbaumer

Prof. Salvatore Maria Aglioti

Prof. Stephane Bouchard

Prof. Tom Rodden

2.27 Virtual Reality

Prof Abderrahmane Kheddar

Prof. Adrian David Cheok

Dr. Andrea Gaggioli

Dr. Annie Luciani

Dr. Antonia Lucinelma Pessoa

Dr. Antonio Frisoli

Dr. Barnabas Takacs

Dr. Brian F. Goldiez

Dr. Bruno Herbelin

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Dr. Narcís Pares

Prof. Olaf Blanke

Prof. Paul Verschure

Dr. Ralph Schroeder

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Mr. Renato Pellegrini

Dr. Slawomir Nikiel

Mr. Steffen Mader

Prof. Stephane Bouchard

Prof. Tassos A. Mikropoulos

Dr. Verónica Costa Orvalho

2.28 Visual Interfaces

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3 PEOPLE

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Research

Abderrahmane Kheddar is currently Directeur de Recherche at CNRS and the Director of the CNRS-AIST JRL (Joint Robotics Laboratory), UMI3218/CRT, he was (1998-2008) professor in computer science and control at the university of Evry and the head of the virtual reality and haptics group of the Laboratoire Systèmes Complexes. He received a DEA (Master of science by research) and the Ph.D. degree in robotics, both from the University Paris 6, France. His research interests include teleoperation and telerobotics, haptics (sensing and display), humanoids (contact planning, dynamic control),and electro-active polymers for haptic displays. He was a member of the Teleoperation Research Group under the French Nuclear Commissariat (CEA) and the French National Scientific Research Center (CNRS) auspices. He was the general chair of EuroHaptics 2006 which held in Paris. He is member of the EuroHaptics steering committee and served as a founding member and in the advisory board of the World Haptics IEEE TC chapter. He is in the editorial board of the IEEE Transactions on Haptics and the International Journal of Intelligent and Robotic Systems. He also served in the editorial board in many robotics conferences.

3.2 Prof. Adrian David Cheok

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Research

Adrian David Cheok (www.adriancheok.info) is Director of the Mixed Reality Lab, National University of Singapore. He is Associate Professor in the Department of Electrical and Computer Engineering. He became Full Professor in Keio University, Graduate School of Media Design from April 2008.

He has previously worked in real-time systems, soft computing, and embedded computing in Mitsubishi Electric Research Labs (Osaka, Japan). He has been working on research covering mixed reality, human-computer interfaces, wearable computers and ubiquitous computing, fuzzy systems, embedded systems, power electronics. He has successfully obtained funding for externally funded projects in the area of wearable computers and mixed reality from Nike, National Oilwell Varco, Defense Science Technology Agency, Ministry of Communications and Arts, National Arts Council, Singapore Science Center, Hougang Primary School. The research output has included numerous high quality academic journal papers, research awards, keynote speeches, international exhibitions, numerous government demonstrations including to the President and Deputy Prime Minister of Singapore, broadcast television worldwide broadcasts on his research (such as CNN/CNBC/ABC/Discovery/National Geographic etc.), and hundreds of international press media articles.

In the Mixed Reality Lab, he leads a team of over 30 researchers and students. He has been a keynote and invited speaker at numerous international conferences and events. He was invited to exhibit for two years in the Ars Electronica Museum of the Future, launching in the Ars Electronica Festival 2003. His works “Human Pacman”, “Magic Land”, and “Metazoa Ludens”, were each selected as one of the worlds top inventions by Wired and invited to be exhibited in Wired NextFest 2005 and 2007.

He was awarded the Hitachi Fellowship, the A-STAR Young Scientist of the Year Award, and the SCS Singapore Young Professional of the Year Award. He was invited to be the Singapore representative of the United Nations body IFIP SG 16 on Entertainment Computing and the founding and present Chairman of the Singapore

Computer Society Special Interest Group on Entertainment Computing. He was awarded an Associate of the Arts award by the Minister for Information, Communications and the Arts, Singapore. He was awarded as Fellow in Education, World Technology Network. He was awarded a Microsoft Research Award for Gaming and Graphics. He received the C4C Children Competition Prize for best interaction media for children, the Integrated Art Competition Prize by the Singapore Land Transport Authority, Creativity in Action Award, and the Nokia Mindtrek Award. He was awarded Young Global Leader 2008 by the World Economic Forum. This honour is bestowed each year by the World Economic Forum to recognize and acknowledge the top young leaders from around the world for the professional accomplishments, commitment to society and potential to contribute to shaping the future of the world.

He is Editor/Associate Editor of the following academic journals: Transactions on Edutainment (Springer), ACM Computers in Entertainment, Advances in Human Computer Interaction, International Journal of Arts and Technology (IJART), Journal of Recent Patents on Computer Science, The Open Electrical and Electronic Engineering Journal, International Journal of Entertainment Technology and Management (IJEntTM), Virtual Reality (Springer-Verlag), International Journal of Virtual Reality, and The Journal of Virtual Reality and Broadcasting.

Adrian David Cheok, who was born and raised in Adelaide Australia, graduated from the University of Adelaide with a Bachelor of Engineering (Electrical and Electronic) with First Class Honors in 1992 and an Engineering PhD in 1998.

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Research

Alberto Sanfeliu received the BSEE and PhD degrees from the Universitat Politècnica de Catalunya (UPC), Spain, in 1978 and 1982 respectively. He joined the faculty of UPC in 1981 and is full professor of Computational Sciences and Artificial Intelligence. He is director of the Instituto de Robotica i Informatica Industrial - IRI (UPC-CSIC), director of the Artificial Vision and Intelligent System Group (VIS), past director of The UPC department “Enginyeria de Sistemes, Automatica I Informatica Industrial” and past president of AERFAI, and he is doing research at IRI, (UPC-CSIC).

He works on various theoretical aspects on pattern recognition, computer vision and robotics and on applications on vision defect detection, tracking, object recognition, robot vision and SLAM. He has several patents on quality control based on computer vision.

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Research

Albrecht Schmidt is a professor for Pervasive Computing and User Interface Engineering at the University of Duisburg-Essen in Germany. Previously he was head of department at the Fraunhofer institute for intelligent information and analysis systems. From 2003 to 2006 he headed the embedded interaction research group at the University of Munich. Albrecht studied in Ulm, Karlsruhe and Lancaster, where he completed his PhD on the topic "ubiquitous computing – computing in context". His teaching and research interests are in media informatics and ubiquitous computing, and in particular in the area of user interface engineering. Albrecht enjoys creating new interaction techniques and interfaces technologies for specific environments such as the home or the car. Over recent years he organized several workshops and conferences and served in various committees in pervasive computing community. His main fields of research are:

- User interfaces for mobile devices and phones
- Human computer interaction in the automotive context, in-car user interfaces
- Sensors and actuators for user interfaces
- Location and context-aware information systems
- Interaction with tangible and embedded systems
- Methods and tools for developing pervasive interactive systems
- Evaluation of ubiquitous computing systems (beyond the lab)
- Modelling complex interactive systems
- Applications of sensor- and actuator networks
- Wearable computing
- Mobile interactive systems and applications

- Pervasive computing technologies for smart advertising

3.5 Dr. Aleksander Väljamäe

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Research

Aleksander Väljamäe has received his PhD in applied acoustics at Chalmers University of Technology, Gothenburg, Sweden, in 2007. During his PhD studies concerning multisensory perception he has being a visiting researcher at University of Barcelona (Dr. Soto-Faraco) and NTT Communication Science Labs, Japan (Dr. Kitagawa). He has being active in a number of EU funded projects: POEMS, PRESENCCIA, BrainAble. In 2007-2010 he has being a postdoc and a psychophysiology lab director at Laboratory for Synthetic Perceptive, Emotive and Cognitive Systems (SPECS), Universitat Pompeu Fabra, Barcelona, Spain, obtaining several grants from national Spanish funding (TEC2009-13780, TEC2010-11599-E). Currently he is a senior postdoctoral researcher at BCI Lab, Technical University of Graz, Austria. His psychophysiology research concerns how audio-visual media influence humans on perceptual and cognitive level, with particular stress on the novel methods for diagnosis and treatment of various brain disorders (e.g. autism, depression, chronic pain, migraine) and new applications (BCI, neurocinema).

3.6 Prof. Alois Ferscha

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Research

Networked Embedded Systems and Architectures
Pervasive, mobile, ubiquitous and wearable computing; autonomic computing and wireless embedded systems; wireless multisensor platforms; context aware and adaptive systems; information appliances; ambient intelligence.

Cooperative Embedded Systems
Coordination models, languages and formal methods; ad-hoc interaction; self-organization and self-management; cooperative sensing, opportunistic sensing; goal-oriented cooperative systems; -ensembles of digital artefacts, networks of things.

Development of Embedded Systems Software
Distributed software and algorithms (specification, correctness, termination, complexity analysis), programming paradigms (OO distributed software models), component technologies/frameworks, embedded and real-time software, service oriented architectures, multiagent (software) systems.

Awareness, Attention, Interaction
Context awareness, group/workspace awareness; peripheral displays, ambient information systems; embedded interaction, tangible interfaces; implicit interaction, activity and mobility recognition; auditory, vibrotactile and olfactory interfaces.

Parallel and Distributed (Interactive) Simulation
Parallel/distributed discrete event simulation (generating models, experimental design, verification, validation, and confidence analysis), distributed interactive simulation, web-based simulation, agent-based simulation, OO simulation, real-time simulation, simulation-aided multiuser environments.

3.7 Dr. Andrea Gaggioli

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Research

I hold a M.S. degree in Psychology from University of Bologna and a Ph.D. in Psychobiology from the Faculty of Medicine of the University of Milan. I am currently researcher at the Psychology Department of Università Cattolica del Sacro Cuore, in Milan, and consultant at the Applied Technology for Neuro-Psychology Lab (ATN-P LAB) of Istituto Auxologico Italiano, a biomedical research institute based in Milan.

Prior to working with these organizations, I collaborated with the Competence Center for Virtual Reality at the Fraunhofer Institute for Industrial Engineering, Stuttgart, Germany.

3.8 Dr-Ing Angelika Peer

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Research

Dr Angelike Peer works as a Senior Lecturer and Post-Doc at Institute of Automatic Control of the Technical University of Munich. Engineering. Dr. Peer's main research interests are:

- Telepresence systems
- Haptic interfaces
- Haptic human-robot interaction

3.9 Dr. Anil Seth

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Research

Anil was born in Oxford, England. After receiving a First from Cambridge University (UK) in Natural Sciences, he gained an M.Sc. with distinction from Sussex University. Anil received his D.Phil. also from Sussex on the subject of artificial evolution. In 2001 Anil joined The Neurosciences Institute, La Jolla, California, where he was a Postdoctoral and then Associate Fellow. Anil returned to Sussex in 2006, where he is now a Reader and EPSRC Leadership Fellow, Co-Director of the Sackler Centre for Consciousness Science, Editor of the Scholarpedia chapter on Consciousness and Editor-in-Chief of Frontiers in Consciousness Research.

3.10 Dr. Annie Luciani

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Research

Presence and believability of multisensory-handled Virtual objects. Technological, psychological and cognitive conditions. Dynamics and geometry. The respective role of the space and time. Temporal latencies, Temporal accuracy. Spatial accuracy. Shapes and time. Shapes as emergent spatio-temporal phenomena.

Physically-based models for computer animation and VR. Design and implementation of real-time physically-based models of complex dynamical phenomena (turbulences, chaotic effects, emergent phenomena, fractures, crowd's behaviour, etc.).

Design of multisensory virtual objects (3D, haptics and sounds).

Gesture and motion capture, coding, analysis, representation.

Design of technologies for high-fidelity and versatile force feedback devices (since 1976).

Implementation of real time multisensory-motor simulation (including the use of gestures, 3D objects and sounds).

Interactive design Software for musical, visual and choreographic arts.

Cognitive sciences en psychophysical experiments in haptics, sounds, visual motion.

3.11 Dr. Antonia Lucinelma Pessoa

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Research

Antonia Lucinelma Pessoa Albuquerque has a background in civil engineer, with a MSc in Computer Graphics, from PUC-Rio University, emphasizing Virtual Sets technologies, and a PhD in Science-Informatics, approaching Presence in virtual interactions and stereoscopic visualization. Since 1996, she has been focusing on research areas that relate virtual and real; from 2001 she researches on remote human interactions, and new media technologies. The main research interests are Presence in virtual environments, people-to-people remote interactions, virtual reality, visual computing, and more recently, perception, human aspects, especially natural binocular human vision. Her ideal research goal in to enrich computational systems by adding features based on neurosciences and psychophysics research results.

3.12 Dr. Antonio Frisoli

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Research

Antonio is Assistant Professor at the Scuola Superiore Sant'Anna. His research interests focus on robotics and haptic interfaces for rehabilitation, and he leads the Group on Human Robot Interaction.

The Human Robot Interaction (HRI) group investigates theories and systems to design new man-machine devices that properly reflect human-centred design requirements. In particular this group develop robotic devices that cooperate with human in a safe and intuitive way during the interaction in virtual environments. The group has solid background in mechanical design, robot design, FEM analysis and control of mechanical systems with specific reference to industrial and medical fields. The group has a consolidated expertise in psychophysics of the human perception and biomechanics of human motion, with specific reference to the tactile and haptic sense, such expertise is being employed for the development of novel haptic devices including large workspace devices, desktop devices and force feedback exoskeletons. One of the most innovative research lines is the development of miniaturized haptic interfaces, portable and wearable.

The HRI group develops new clinical robotic and virtual environment systems for the motor neuro-rehabilitation in patients having central or peripheral neurological pathologies, such as strokes and/or childhood paralyses. The use of robots in this field allows achieving an intense clinical treatment, having good repeatability, interactive and well focused on the rehabilitation motion required.

3.13 Prof. Antonio Kruger

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Research

Antonio Krüger received a diploma in computer science and economics at Saarland University in 1995. Afterwards he joined the Cognitive Science Graduate Programme of the same University and finished it with a doctoral degree in 1999. His doctoral thesis was on the "Automated Abstraction of 3D-Graphics". He was involved in several Artificial Intelligence projects at the German Research Centre for AI (DFKI GmbH), and later from 1999-2003 at the Intelligent Systems Lab of Saarland University as a Senior Researcher. In 2000 he co-founded the University spin-off Eyeled GmbH, a company focusing on mobile computing solutions. Within the company he is responsible for the technology transfer of university research. From 2004 to 2009 he was an associate professor for Geoinformatics and Computer Science at Münster University, Germany. From 2005 to 2009 he was the managing director of the institute for Geoinformatics at the same University. Since 2009 Antonio Krüger is a full professor for Computer Science at Saarland University. At the same time he has been appointed as the Scientific Director of the Innovative Retail Laboratory at the German Research Center for Artificial Intelligence (DFKI) in Saarbrücken, Germany. Antonio's main research areas are Intelligent User Interfaces and mobile and ubiquitous context-aware Systems. He worked on the automatic generation of graphics for technical documentations, intelligent navigation systems and personalized media generation. In this context he looked at generation processes that take into account both the limited technical resources of output devices and the limited cognitive resources of the users. More recent examples of his research come from the domain of mobile and ubiquitous computing. Here, Antonio is involved in projects on interactive display networks, mobile augmented reality and interactive surface computing. Antonio is co-organising the annual Smart-Graphics Symposium and served on various program committees in the field of intelligent mobile systems, e.g. Intelligent User Interfaces, User Modeling, Ubicomp, Mobisys, and Pervasive Computing.

3.14 Dr. Aureli Soria-Frisch

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Research
Dr. Aureli Soria-Frisch was born in Barcelona. He received the 'Enginyer Tècnic en Telecomunicacions' degree (equivalent BSc) from the University Ramon Llull (Barcelona) in 1992, the 'Enginyer de Telecomunicació' degree (equivalent MSc) from the Politechnical University of Catalonia– UPC (Barcelona) in 1995, and the 'Dr.-Ing.' degree (equivalent PhD) from the Technical University Berlin in 2004. Between 1996 and 2005 he worked at the Department for Security Technologies of the Fraunhofer IPK (Berlin), where he participated in several funded research and industrial projects as research scientist and project leader. After working for 3 years at the Universitat Pompeu Fabra and part time in Starlab, he joined the company with a full engagement in 2008. He is working as Program Manager of the Neuroscience Unit since beginning 2011. His research interest is focused on the fields: data and multi-sensory fusion, computational intelligence for data analysis, and soft computing for image processing and analysis. He authored nine journal papers, five book chapters, and several conference papers.

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Research
Dr. Takács is an internationally recognized scientist who has spent much of his carrier developing cutting-edge technologies and has a long history of bringing novel solutions to the market place. A graduate of the Technical University of Budapest in Electrical

Engineering and Informatics, he later received his M.S. from the Univ. of Houston, USA and a Ph.D. from computational Sciences from GMU, VA, USA. Currently he holds the position of Director of Virtual Human Group at SZTAKI, Hungarian Academy of Sciences.

Dr. Takács is the Founder/President of Digital Elite Inc, a Los Angeles-based animation company specialized in developing a high performance portable virtual reality and digital human animation platform called the Virtual Human Interface (VHI).

The VHI forms the foundation of a large variety of novel real-time applications where a new generation of input/output devices, digital environments and virtual humans create an interactive experience.

Examples include virtual reality therapy, clinical rehabilitation, ambient intelligence, interactive information kiosks as well as classical applications such as pre-visualization for film, games and location-based entertainment.

Dr.Takács has spent the much of his career developing the necessary technology to bring high-fidelity virtual humans to life. His experience includes computer vision, facial tracking, 3D modeling, animation and deformation systems, real-time lighting and rendering as well as virtual reality. In 1999, as the Director of R&D, he helped create the first ever Digital Clone for film by bringing the late move star Marlene Dietrich "back to life". He published over 55 scientific papers and lectures extensively around the world discussing the scientific foundation, technological trends, the business environment and most importantly the ethical and legal issues of virtual human technology.

3.16 Dr. Brendan Allison

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Research

Brendan Allison received his PhD in Cognitive Science from the University of California in 2003. Since then, he has worked in the Wolpaw lab in the Wadsworth Center in New York, Polich lab in The Scripps Research Institute in San Diego, and Pfurtscheller lab in the Laboratory of BCIs in Graz. His main interest is hybrid BCIs. He is presently the Project Coordinator for Future BNCI.

3.17 Dr. Brian F. Goldiez

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Research

Brian Goldiez focuses on augmented reality systems employing wearable (or handheld) computers or ubiquitous computing environments. Both wearable's and ubiquitous computing offer their own technical challenges. Dr. Goldiez research involves studies in optimizing existing AR system resources and identifying and filling technology gaps. In this regard his research is focused on approaches and strategies that optimize human performance with various interface devices in areas such as navigation and wayfinding, search and rescue, and other mobile tasks. Dr. Goldiez research involves measurement of effectiveness of various AR implementations, including presence, in these environments. He is currently involved in research approaches for measuring presence across different wearable systems including collaborative interactions with robotic entities. Goldiez is also directing a doctoral student's research into the utility of presence when one is repeatedly inserted in virtual environments for training purposes. Goldiez has recently completed an AR research agenda for training that includes presence. This program was sponsored by the US Army Research Institute for Behavioral Sciences. Goldiez teaches a course in VR.

3.18 Dr. Bruno Herbelin

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My interest for virtual reality started much before my Ph.D. work; I started to develop virtual environments in 1997 (CICV) and I had the opportunity to work with graphics (O2, ONYX) and to interface various trackers and displays. To continue into VR (which was not really the kind of job i would have find with my engineering diploma), I started a Master in Strasbourg in 1998 (engineering diploma was not recognized by universities). The Master specialization I took was on artificial intelligence and neural networks. I also had the opportunity to become more familiar with scientific methods, mathematics for computing and graphics, and parallel processing.
Then, I started a Ph.D. on a rather engineering-oriented European project (at VRLab in EPFL) and afterwards I had the luck to be involved into a local Swiss project linking VR and psychotherapy. This project about the "virtual reality exposure therapy" of phobias became my Ph.D. topic, and the core of my research interest for my last 3 years

at VRLab. In 2005, I presented my experimental work on the exposure of people to social anxiety provoking virtual environments, and Dr. F.Riquier continued the clinical validation of the software tools (providing real-time animation and control of virtual humans).
To follow up on the therapeutic application of VR, I went to Denmark to work with T.Brooks. There, I took part in the creation of the Sensorama Laboratory, a place dedicated to the experimental work on the use of interaction and multimedia technologies (including VR) for rehabilitation and special needs. As I had an Assistant Professor position there, I also had quite a lot of teaching and took part in the elaboration of multiple research grant applications.

3.19 Mr. Christian Peter

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Research

Christian Peter obtained his Masters Degree (Diploma) in Electrical Engineering in 1996 from the University of Rostock, Germany. From 1997 to 2000 he was researcher at the Computing Laboratory of Oxford University, UK in the field of hardware development and systems design for novel sensor technologies. Since 2000 he is with Fraunhofer IGD Rostock, focusing his research on the development of intelligent, self-contained, non-obtrusive sensors for affect-related physiological parameters and the analysis and application of the obtained data.

His related scientific interests lie on: physiology of emotions, particularly (peripheral) psycho-physiological reactions in users while interacting with their environment; emotion representation in digital systems; and emotion-related speech analysis. In latest activities he is also investigating if and how cognitive states can be measured with little or even non-obtrusive means.

He presented his work in international journals, book chapters, and on international conferences. He received two Patent Awards of the INIGraphics-Net foundation in 2005 and 2006 for two submitted patents in the field of physiology-based emotion detection.

Christian is initiator and co-organizer of the workshop series on Emotion in Human-Computer Interaction and served on the scientific committee for several conferences, workshops and symposia related to affect and emotion in human-computer interaction.

3.20 Prof. Chris Raymaekers

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Research

The research of Chris Raymaekers focuses on multimodal interaction in virtual environments and is situated within the domain of human-computer interaction.

Within this research, new interaction paradigms are developed and evaluated. This includes selection techniques, navigation techniques and hybrid 2D/3D user interfaces. Over the past few years, much attention has been paid to haptic interaction. Recently, feedback by using audio output is also one of the research topics. The goal is to realize a functionally and usable multimodal user interfaces.

As the creation of virtual environments and interaction techniques is a difficult task, attention is also paid to support for developers and designers. Based on a model-based user interface development (MBUID) approach, we have developed NiMMiT, a graphical notation, which allows designing multimodal interaction technique, without having to manually implement them.

3.21 Dr Christoph Guger

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Research

Christoph Guger studied biomedical engineering at the University of Technology Graz and Johns Hopkins University in Baltimore, USA. Then he carried out research work at the Department of Medical Informatics at the University of Technology Graz and received his PhD degree in 1999. The topic of his PhD work was the design of an EEG-based brain-computer interface.

In 1999 g.tec was founded by Christoph Guger and Günter Edlinger as a spin-off from the Graz University of Technology, sells its award-winning technology to companies, universities and research institutes in more than 60 countries.

The BCI technology developed by g.tec is also in use in various EC projects such as PRESENCCIA, SM4All, Brainable, Better and ALIAS and won the European Information and Communication Technology award in 2007, the Econovius award in 2008, the Microsoft Innovation Award in 2010.

3.22 Prof. Danilo De Rossi

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Research

Danilo De Rossi received the "Laurea" degree in Chemical Engineering from the University of Genoa in 1976. From 1976 to 1981 he was researcher of the Institute of Clinical Physiology of C.N.R. He had appointments for teaching and research in Australia, Brasil, France, Japan and USA. He joined the Faculty of Engineering in the University of Pisa in 1982 where he is currently Full Professor of Bioengineering and coordinator of the Bioengineering Group at the Interdepartmental Research Centre "E. Piaggio". His scientific activities are related to the physics of organic and polymeric materials, and to the design of sensors and actuators for bioengineering and robotics. He received the "Bioengineering Forum Award" of the Biological Engineering Society (UK) in 1980, and the "Young Investigator Award" of the American Society for Artificial Organs (USA) in 1985. He is author of over 270 peer reviewed papers on international science journals and peer reviewed proceedings, co-inventor of 14 patents and co-author of 8 books.

3.23 Prof. David Benyon

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Research

David Benyon's research focus since joining Napier University in 1996 has been to shift attention from a narrow view of human-computer interaction (HCI) to the idea of 'navigation of information space'; a new view of HCI that focuses on how people find their way around the information spaces created by new media. He has just finished working on a major textbook called *Designing Interactive Systems*. Co-authored with Phil and Susan Turner, this was published in November 2005. He has a book for MIT Press (published in 2007 and co-authored with Manual Imaz) on HCI theory called *Designing with Blends: conceptual foundations of human-computer interaction and software engineering*. The main focus of this work is currently artificial companions for older people, and virtual environments. This has encouraged an exploration of the demands of different people and on understanding the design aspects of virtual places that give people a sense of presence.

3.24 Dr. Elaine M. Huang

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Research

Elaine M. Huang is an Associate Professor of Human-Computer Interaction at UZH and head of the People and Computing Lab at the Department of Informatics.

She joined UZH in September 2010. Previously, she held positions as an Assistant Professor at the University of Calgary, Canada and as a Senior Staff Research Scientist at Motorola Labs, USA. She received her Ph.D. in Computer Science from the Georgia Institute of Technology in 2006. Her main fields of research concern:

- Sustainability: interested in using sustainable information from LCA (Life Cycle Assessment) databases to empower users and let them make more environmentally-informed choices in their everyday life.
- Human Home Interaction: interested in learning about the appeal of home automation, the various ways it can be realized and effects it has on the inhabitant's life and home quality.
- Tangible systems attempt to bridge the physical and the digital worlds. This project explores the potential of tangibles for augmenting the physical artifacts used in HCI work.

3.25 Prof. Elisabeth Andre

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Professor Elisabeth André is a full professor of Computer Science at Augsburg University, Germany, and Chair of the Laboratory for Multimedia Concepts and their Applications. Prior to that, she worked as a principal researcher at DFKI GmbH where she has been leading various academic and industrial projects in the area of intelligent user interfaces. Professor André research is mainly focus on

- Design and evaluation of interactive multimodal user interfaces
- Experimental learning environments with animated characters
- Affective Computing
- Tangible and perceptive user interfaces
- Interaction techniques for augmented realities
- Interaction in pervasive environments
- Multimodal analysis (physiological data, gaze, speech, gestures)

3.26 Dr. Franco Tecchia

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Research

Franco is Assistant Professor at Scuola Superiore Sant'Anna. He leads the Computer Graphics & Virtual Enviroments Group. Professor Techia is focus on the innovation in the field of visualisation and network technologies that allow the creation of Virtual Environments where a multitude of users geographically distributed around the world can collaborate on common tasks by means of Virtual Environments and interactive 3D graphics.

In this fields, PERCRO investigates and develops new approaches for the management of high complexity models, to allow the necessary real-time interaction and visual rendering realism capability.

Research is focused, in particular, on the needs of Distributed Virtual Environments. Within the Area, research involves: immersive visualisation systems, high efficiency rendering algorithms for photorealistic or non-photorealistic rendering (illumination, shadowing, ray tracing, shading), geometric data compression (both for storage and transmission), and geometry fidelity for reconstructed 3D models. In the context of visualisation systems, an intriguing challenge is to allow multiple users to operate at the same time inside the same CAVE-like environment (CAVEs are usually mono-user).

In terms of application fields, there are three topics of particular interest: Industrial processes, Cultural Heritage and Architecture/Archaeology. Scientific topics relevant to these application areas are: the creation of development frameworks able to manage complex 3D models and multimodal interaction, the development of new interactive and non-invasive techniques for the digital acquisition and documentation of artistic manufacts, the design of new interaction paradigms with Virtual Environments.

3.27 Prof. Gerhard Widmer

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Research

Gerhard Widmer is since 2004 Professor of Computational Perception at Johannes Kepler University in Linz and head of the Intelligent Music Processing and Machine Learning at the Austrian Research Institute for Artificial Intelligence (OFAI) in Vienna. Gerhard Widmer obtained his diploma in computer science at the Technical University of Vienna in 1984 and his master's degree in Computer Science in 1986 from the University of Wisconsin, USA. He received his doctorate from the Technical University of Vienna in 1989.

Gerhard Widmer's research focus in the intersection of computer science, artificial intelligence and music. His work cover a wide range from purely knowledge-oriented research (quantitative computer-based analysis and modeling of artistic musical interpretation) to the development of musically intelligent algorithms with high and commercial relevance (such as programs that simulate aspects of human music perception).

Future challenges that will arise Gerhard Widmer and his team in Linz and Vienna, aim to achieve substantial understanding of music machine based to make music meaningful and useful allowing interaction between computers and humans through music.

3.28 Mr. Gianluca Zaffiro

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Research

Gianluca ZAFFIRO joined Telecom Italia LAB in 1994. Currently he works in the Research & Trends department, where he is doing research on Telecommunications trends, defining scenarios of ICT evolution and their impact on communication biz. In the previous years he worked to support strategic technology innovation in the Mobile Service area of TIM, with special focus on Mobile Instant Messaging, a communication messaging service based on Presence, that was launched by TIM in 2000. His interests include how to improve mediated communications and how this would have an impact on the telecommunications business, trying to figure out how telecommunications in the future will evolve exploiting Presence technologies and other technical improvements.

3.29 Prof. Giorgio De Michelis

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Research

Prof. Giorgio De Michelis teaches Theoretical Computer Science and Information Systems at the University of Milano – Bicocca, where he has served as Director of the Department of Informatics, Systems and Communications from 2002 to 2007. His research focuses on:

- Multimedia mobile and ubiquitous applications supporting cooperation and knowledge management within professional organizations and/or social interaction within communities

- Systems supporting multi-disciplinary design processes in areas like architecture, design and ICT applications.
- Augmented reality systems for distributed multi-sensorial games.
- Technologies for contemporary art.

3.30 Dr. Giulio Ruffini

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Research

Dr. Giulio Ruffini was born in Barcelona, Spain, in 1966. He obtained the B.A. Degree in Mathematics and in Physics from the University of California, Berkeley in 1988, and the M.S. and Ph.D. degrees in Physics from the University of California, Davis in 1990 and 1995, respectively. As an undergraduate he received several Mathematics and Physics scholarships and joined the KSU and Berkeley Sigma Pi Sigma chapters. At that time he collaborated with the KSU optics lab (picosecond laser physics) and in the Lawrence Berkeley laboratory cryogenics lab. During the summers of 1990 to 1995 he was a graduate researcher in theoretical physics at the Los Alamos National Laboratory in New Mexico and at UC Davis, working on fundamental aspects of the quantization of Quantum Gravity. After his PhD he moved back to Barcelona, Spain, to join the Institut d'Estudis Espacials de Catalunya, where, until September 2000, he was a researcher in the Earth Observation Group developing algorithms for GPS scientific applications, radar and EEG data analysis. In 2000 he and other partners founded Starlab Barcelona, a company committed to the transformation of research into technologies with positive impact through research, development and market intelligence. He is since working at Starlab as Director and researcher. His current research includes the development of novel sensors for brain monitoring exploiting new technologies, brain stimulation technologies, EEG data analysis for studying, monitoring and interfacing with the human brain—as well as developing new Earth Observation sensors and algorithms. Dr. Ruffini has led several ESA projects on radar technology development and he was the technical manager of the SENSATION FP6 IP project (new sensors, algorithms and systems for monitoring the human brain ubiquitously). Recently, he managed the PEACH Coordination Action on Presence technologies for the Future and Emerging Technologies department of the European Commission. Presently he coordinates and carries out biophysics research in the FET Open project HIVE (Hyper-interaction viability experiments), focusing on non-invasive current brain stimulation technologies and applications and the BEAMING IP (Being in Augmented Multi-modal Naturally-Networked Gatherings, Networked media and 3D internet), while continuing to contribute to research for new radar instrument concepts. In 2010, to complement his

education, he completed a General Management Program (PDG) at IESE Business school in Barcelona.

3.31 Prof. Giulio Jacucci

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Research

Giolio Jacucci currently holds the position of Professor at the Department of Computer Science of the University of Helsinki and Professor at the Departement of Design of the School of Art and Design in Aalto University.

Jacucci is Co-leader of the Ubiquitous Interaction group at the Helsinki Instititute for Information Technology. Ubiquitous Interaction (UIx) studies opportunities in ubiquitous and mobile computing, coupling in-depth user studies with design in the area of novel interfaces. The goal is to contribute to technology development efforts by deepening understanding of human perspectives. Currently, research is conducted in five areas: Mobility, Collectivity, Performative Interaction, Environmental Awareness, Mobile 3D Maps.

Prof Jacucci is also responsible for national and European research projects on interaction design of mixed reality and ubiquitous computing applications.

3.32 Dr. Henriette Cramer

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Research

Henriette Cramer graduated with a PhD from the Human Computer Studies Lab at the University of Amsterdam in April 2010. Her PhD focused on user interaction with user-adaptive and semi-autonomous systems and involved user studies to gain more insight in user behaviour, (affective) reactions and trust. Subprojects involved interaction with personalised recommenders and information filters, mobile devices and human-robot interaction.

In 2010 Henriette Cramer joins the Mobile Life Center in Stockholm as a human-computer interaction researcher. Henriette Cramer is interested in how people perceive technology and use it in their daily lives, playfulness, mobile interaction, location-based services, services as design materials, social space & place, urban computing, social connections, interaction with (semi-) autonomous devices & human-robot interaction, affective and physical interaction, transparency and user understanding, social media and trust and situated user experiences. At MobileLife she is working on projects involving interaction with mobile applications, location-based services such as Foursquare or Gowalla.

3.33 Prof. Igor Pandzic

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Research

Igor S. Pandzic is a Professor at the Department of Telecommunications, Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia. His main research interests are in the field of computer graphics and virtual environments, with particular focus on facial animation, embodied conversational agents, and their applications in networked and mobile environments. Igor also worked on networked collaborative virtual environments, computer generated film production and parallel computing. He published three books and around 60 papers on these topics. Igor was one of the key contributors to the Facial Animation specification in the MPEG-4 International Standard for which he received an ISO Certificate of Appreciation in 2000.

3.34 Dr. Isabelle Viaud-Delmon

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Research

Dr. Isabelle Viaud-Delmon (PhD in Cognitive Sciences from University Paris 6) is a CNRS research scientist in behavioural neuroscience, and will be responsible for the IRCAM contribution to the project. She works in the Spatialisation team (Dr. Olivier Warusfel) of IRCAM. Her field of research is dedicated to the study of multisensory integration and spatial orientation both in patients and normal subjects, with virtual reality techniques integrating spatial audition. She was coordinator of the project "Multisensory information processing in virtual reality: application to psychopathology" supported by the French program "Cognition and information processing" from the CNRS, grant CTI 01-54, and a principal investigator for CNRS of the FP6 IST Open FET project CROSSMOD (Cross-modal perceptual interaction and

rendering: a new generation of audiovisual virtual environments). The Spatialisation team has been involved in several FP5 and FP6 IST European projects, and is currently involved in the FP7 IST SAME project dedicated to active music listening in the context of mobile phone communication.

3.35 Dr. Ilona Heldal

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Research

Ilona Heldal is PhD and Assistant Professor at the Department Technology, Management and Economics at Chalmers University of Technology, Gothenburg, Sweden. Her interest in improving telecommunication to better support human communication comes from earlier work with designing mobile communication systems at Ericsson AB. Now she has 8 years experience in research and teaching on social interaction and group collaboration in new media, with special focus on examining presence, user experiences, and usability in virtual environments. One of the main challenges in her interdisciplinary research is to understand and take advantage of the impact of collaboration context on experiences and effectiveness.

3.36 Prof. Joe Paradiso

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Research

Joseph Paradiso directs the Responsive Environments group, which explores how sensor networks augment and mediate human experience, interaction, and perception. In addition, he co-directs the Things That Think Consortium, a group of industry sponsors and Media Lab researchers who explore the extreme fringe of embedded computation, communication, and sensing.

After two years developing precision drift chambers at the Lab for High Energy Physics at ETH in Zurich, he joined the Draper Laboratory, where his research encompassed spacecraft control systems, image processing algorithms, underwater sonar, and precision alignment sensors for large high-energy physics detectors. He joined the Media Lab in 1994, where his current research interests include embedded sensing systems and sensor networks, wearable and body sensor networks, energy harvesting and power management for embedded sensors, ubiquitous and pervasive computing, localization systems, passive and RFID sensor architectures, human-computer interfaces, and interactive media. His honors include the 2000 Discover Magazine Award for Technological Innovation, and he has authored 200 articles and technical reports on topics ranging from computer music to power scavenging.

After receiving a BS in electrical engineering and physics summa cum laude from Tufts University, Paradiso became a K.T. Compton fellow at the Lab for Nuclear Science at MIT, receiving his PhD in physics there for research conducted at CERN in Geneva.

3.37 Prof. John Alexander Waterworth

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Research

John Waterworth Interest areas:

- Older Users, including the development of technologies for safe independent living.
- Cognition and ICT, including the use of appropriately designed interactive technology for the maintenance and improvement of cognitive functions. This topic is also highly relevant to the ageing society.
- Interaction and Emotion, including sensing and interpreting emotions, and environments that evoke emotion in their users. Models of emotion and interaction.
- Functioning in Physical/Virtual Mixed Spaces, including issues relevant to functional and safe existence and travel in and through such blends. How do we create a blended sense of presence that takes account of attentional limits and characteristics, reality judgments and emotional responses.
- Physical Rehabilitation, through the application of new “embodied interaction” possibilities. Wearable and other interaction devices. Design, development, testing of effects.
- eInclusion and eAccessibility, for all age groups and abilities

3.38 Dr. Jonathan Freeman

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Research

Dr Jonathan Freeman, BSc (Hons), MPhil (Sheffield), PhD (Essex) is Managing Director of i2 media research ltd. and Senior Lecturer in Psychology at Goldsmiths, University of London. He directs all research conducted by i2, including academic research projects. Various members of his team are involved in for the European Commission.

Jonathan's expertise is in the area of user research, with a focus on adoption and use of media products and services. He has over 15 years experience in the evaluation of new media products and services, using the full range of methodologies deployed by i2, successfully disseminating results within both academic and industrial contexts. Jonathan's experience spans:

- Conducting user research with consumers with a broad range of interests, skills, and abilities;
- Evaluating user experience of media products and services (across computer games, TV, radio, fixed and mobile telephony and broadband/PC);

Jonathan is leading a consortium of European universities that also includes the Department of Computing of Goldsmiths University of London, in a four-year project (CEEDS) which aims to take the merging of virtual reality and human consciousness to new levels.

3.39 Dr. Jörg Voskamp

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Research

Dr.-Ing. Jörg Voskamp leads the competence center »Usability and Assistive Technologies« at Fraunhofer Institute for Computer Graphics Rostock.

Dr. Jörg Voskamp studied electrical engineering at the technical universities Sophia (Bulgaria) and Dresden (Germany) and finished his studies in 1993 with diploma. In 2004 he received his PhD (Dr.-Ing.) from the University of Rostock.

He works with Fraunhofer IGD Rostock since 1993. In 2000 he was selected head of the department Human-Centered Interaction Technologies. Since 2007 Dr. Jörg Voskamp leads the competence center Usability and Assistive Technologies at Fraunhofer Institute for Computer Graphics Rostock.

His research interests are in the development of adaptive and emotion-based computer interfaces as well on the interface technologies.

3.40 Prof. José del R. Millán

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José del R. Millán is the **Defitech Professor** at the Swiss Federal Institute of Technology in Lausanne (EPFL) where he explores the use of brain signals for multimodal interaction and, in particular, the development of non-invasive brain-controlled robots and neuroprostheses. In this multidisciplinary research effort, Dr. Millán is bringing together his pioneering work on the two fields of *brain-computer interfaces* and *adaptive intelligent robotics*.

He received his Ph.D. in computer science from the Univ. Politècnica de Catalunya (Barcelona, Spain) in 1992, where he was an assistant professor for three years. He was also a research scientist at the Joint Research Centre of the European Commission in Ispra (Italy), a senior researcher at the Idiap Research Institute in Martigny (Switzerland), and a visiting scholar at the Universities of Stanford and Berkeley as well as at the International Computer Science Institute in Berkeley.

His research on brain-computer interfaces was nominated finalist of the *European Descartes Prize 2001* and he has been named *Research Leader 2004* by the journal Scientific American for his work on brain-controlled robots. The journal *Science* has reviewed his work as one of the world's key researchers in the field of brain-computer interfaces. Dr. Millán is the coordinator of a number of European projects on brain-computer interfaces and also is a frequent keynote speaker at international events. His work on brain-computer interfaces has received wide scientific and media coverage around the world.

3.41 Dr. Josh Bongart

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Research

Josh Bongard is an assistant professor at the University of Vermont. He is an NSF CAREER award recipient, a member of MIT Technology Review's 'Top 35 Innovators under the Age of 35', and a Microsoft Faculty Fellow. He received his Bachelors degree in Computer Science from McMaster University, Canada; his Masters degree in Evolutionary and Adpative Systems from the University of Sussex, UK; and his PhD from the University of Zurich, Switzerland. He also served as a postdoctoral associate in the Computational Synthesis Laboratory at Cornell University.

Dr Josh Bongard seeks to create an automatic robot design with little or no human intervention. Using the concept of evolutionary computation, he can throw light on the design of virtual robots which can exploit the physical dynamics of their environment to generate behavior. Moreover, he has developed a simulation system called, Artificial Ontogeny, which combines artificial evolution with artificial development which has the potential to contribute to embodied cognitive science by providing examples of the evolution of intelligence in a virtual environment.

3.42 Prof. Jürgen Jost

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Research

Born on June 9, 1956 in Münster. Study of mathematics, physics, economics and philosophy at Bonn Univ. (1975-1980), PhD in Mathematics (1980), Professor Ruhr Univ. Bochum (1984-1996), Director and Scientific Member at the Max Planck Institute for Mathematics in the Sciences (since 1996), Honorary Professor at Leipzig Univ.

(1998), External Member Santa Fe Institute for the Sciences of Complexity, New Mexico, USA. Member of the German National Academy of Sciences Leopoldina, Academy of Sciences and Literature at Mainz, Saxonian Academy of Sciences. Gottfried-Wilhelm-Leibniz Award of the DFG (1993), ERC Advanced Grant (2010).

Research group Jürgen Jost in the Max Planck Institute for Mathematics in the Sciences of Leipzig is an interdisciplinary research team that on one hand carries out research in pure mathematics and on the other hand explores new approaches to complex systems in a wide range of domains, bringing in the spectrum of mathematical concepts and methods in novel ways. Jurgen Jost Group main research topics are:

- Geometry, Analysis and Theoretical Physics
- Dynamical Systems and Network Analysis
- General Theory of Complex Systems
- Cognition and Neurosciences
- Theoretical and Mathematical Biology
- Economics and Social Sciences
- Philosophy, History of Science, Visual Arts

3.43 Dr. Luciano Gamberini

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Research

Dr Luciano Gamberini currently holds the position of Associate Professor of General Psychology, Department of General Psychology. He is Professor of Ergonomics - Social Ergonomics - New Communication Environments, Ergonomics of Communication, Advanced Cognitive Ergonomics (UNITN), Work Psychology

In 2011 Luciano Gamberini and Anna Spagnoli founded the Human Technology Lab (HTLab). HTLab is based at the Università degli Estudie di Padova (Padua, Italy). HTLab is located inside the Department of General Psychology, where HTLab has facilities and research devices suitable to carry out state-of-the-art scientific work and to train our pre/post graduate students.

HTLab is a member of the CISC (Centre for Cognitive Science), of the ACM SIGCHI Italy (Special Interest Group on Human-Computer Interaction) and of the IACR (International Association for Cybertherapy and Rehabilitation).HTLab cooperates with many partners around the world and with them they take care of several basic or applied research projects, particularly involved in EU founded project inside the VII Framework Program for Scientific Research in the ICT area.

3.44 Dr. Manuel Ferre Perez

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Research

Laurea Degree in Control Engineering and Electronics in 1992 and PhD in Automation and Robotics in 1997, at the Universidad Politécnica de Madrid (UPM). In 1990, he started his research activity at this university, where he is currently a Profesor Titular since 2000. In 1997, he worked as a PostDoc in the Human-Machine System Laboratory of Massachusetts Institute of Technology (MIT).
He has participated and coordinated several research projects in robotics and automatic control, both at national and international programs. His research interest is focused on automatic control, advanced telerobotics, and haptics. He has two patents of haptic devices and stereoscopic video cameras. He has been a co-editor of Advances in Telerobotics, a book of Springer STAR series and author of many papers on bilateral control and human interfaces for teleoperation.
He is member of IEEE and serves as chair of the RAS Technical Committee on Telerobotics. He is also member of EuroHaptics Society where he serves as Treasurer. He has participated in International Program Committees of several conferences highlighting some editions of IROS and EuroHaptics. He was the chairman of the First Int. Workshop on Telerobotics in 2004 and hosted the EuroHaptics 2008 conference.

3.45 Dr. Marc Ernst

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Research

Scientific area of interest: For perceiving the environment our brain uses multiple sources of sensory information derived from several different modalities, including vision, touch and audition. The question how information derived from these different sensory modalities converges in the brain in order to form a coherent and robust percept is central to understanding the process of perception. Combination and integration of multiple sources of sensory information is the key to robust perception, because no information processing system, neither technical nor biological, is powerful enough to "perceive and act" accurately under all possible conditions.

3.46 Dr. Maria Victoria Sanchez Vives

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Research

Dr. Sanchez Vives currently holds the position of Principal Investigator and Head of System Neuroscience Team in Cortical Networks and Event Lab. The group is interested in the understanding of how the brain works carrying on two main lines of research:

Electrophysiology of the cerebral cortex.

- Analysis of the emerging activity from the neuronal cortical network: rhythmic and persistent activity.
- Sensory processing, with an emphasis in adaptation mechanisms.

- Cortical synaptic plasticity.

The understanding of the structural basis of the observed function and the integration of our physiological and anatomical data in computer models of the cerebral cortex are fundamental elements of our work.

The perceptual roots of Presence in virtual environments as well as the exploitation of virtual reality for the understanding of brain function.

- Mechanisms of spatial processing.
- Body perception.
- 3D visualization of neurons.

3.47 Dr. Mariano Alcañiz

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Research

Mariano Alcañiz was born in 1962. He completed his M.S.in Industrial Engineering at the Technical University of Valencia (UPV) in 1985 and Ph.D. in 1992. Since 1986 he has been a scientific fellow at the Department of Graphical Engineering at the UPV, where he has dealt with Computer Graphics. His current position is Full Professor and director of the Medical Image Computing Laboratory (MedIClab). His research interests and current activity involve computer assisted medical interventions, virtual reality and HCI. He is author and co-author of more than 150 scientific papers in national and international scientific journals and conference proceedings. Computer assisted medical interventions, virtual reality and HCI. He is author and co-author of more than 150 scientific papers in national and international scientific journals and conference proceedings. Research interests include:

- Objective measures of presence using medical imaging
- Virtual therapy
- Emotional computing
- Pervasive computing and ubiquitous computing for human well being
- Natural man machine interface and influence on presence
- Seamless integration of AR interfaces

3.48 Dr. Martin Buss

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Research

Dr. Martin Buss currently holds the position of Chair and Director and Full Professor at the Institute of Automatic Control Engineering at the Technische Universitat Munchen, Dr. Buss main research interests are hybrid dynamical systems, optimal control, nonlinear control systems, nonholonomic systems, real-time optimization techniques, dextrous hand manipulation control, multi-legged locomotion, humanoid walking, control using computer vision, human-machine systems, teleoperation, virtual reality, medical applications

3.49 Prof. Massimo Bergamasco

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Research

Prof. Massimo Bergamasco is Full Professor of Mechanics of Robots and Virtual Environment at Scuola Superiore S.Anna. Bergamasco is currently the Coordinator of the PERCRO. His research deals with the study and development of haptic interfaces for the control of the interaction between humans, Interaction Design and Virtual Environments.

3.50 Prof. Mel Slater

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Research

Prof Slater is an ICREA Research Professor at the University of Barcelona in the EVENT Lab. He founded the Virtual Environments and Computer Graphics group in the Department of Computer Science, University College London, where Prof Slater still has several projects and PhD students.

Prof Slater main research interest is to radically extend the boundaries of virtual reality. He is interested in applications that involve simulations of social situations that are difficult or impossible to realise in physical reality, even to the extent of transforming the very body of the participant. This research borders on neuroscience, in the area of body representation - dealing with the question of how the brain represents the body, how a distinction is made between what is and what is not part of the body. I also remain interested in the issue of presence in virtual reality. Under what conditions do people tend to respond realistically to virtual situations and events? Prof Slater has distinguished between two dimensions of this - 'place illusion' the strong illusion of being in the virtual place, and 'plausibility' the illusion that the events that are occurring there are really happening. A new methodology based on these notions has recently been published. He leads the Event Lab in Barcelona, which is a computer science group located in the Faculty of Psychology at the University of Barcelona. Event Lab research is both on the technical side concerning new advances in computer graphics and virtual reality related work, and the scientific side related to body representation and presence.

3.51 Prof. Miriam Reiner

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Research

Prof. Miriam Reiner is the head of the Technion touch lab. We are interested in how haptics convey information about the environment and how this information is used to construct a hypothesis about presence. Our experiments deal with the principal cues in haptic performance, in tele-manipulation such as in telesurgery, collaborative haptics, and exchange of haptic information for optimal collaboration.

Another group of our experiments look at the neurological and cognitive correlates of haptic performance. We look at the ERP's of haptic perception and performance as related to integration of sensory modalities. Especially we look at the haptic impact on perception in multisensory environment when cues are congruent or not. fMRI studies are performed in order to look at haptic learning, perception and interaction with other modalities such as visual/auditory.

A third group of experiments is focused on the integration of sensory modalities. We study perception and decision making based on sub/liminal sensory cues in virtual and augmented worlds. Other issues related to this group of experiments are learning and training and haptic illusions, such as the Rubber hand illusion applied to Virtual hands in multi and uni-sensory environments.

3.52 Dr. Narcís Pares

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Universitat Pompeu Fabra

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Research

Associate Professor in the ICT Department (DTIC) of Universitat Pompeu Fabra (Barcelona, Spain). He has an interest in: Full-body or Embodied Interaction and more specifically in Interactive Playgrounds. His approach starts from Interaction Design, Interactive Communication and Interaction Models. He is part of the Cognitive Media Technologies Group.

His background is: PhD in Audiovisual Communication -specialized in Virtual Reality- (UPF), MSc in Image Processing and Artificial Intelligence (UAB) and BSc in Computer Engineering (UPC).

He is co-creator and coordinator of the Interdisciplinary Master in Cognitive Systems and Interactive Media (UPF).

Some important projects are: MEDIATE funded by the IST of the European Commission, Water Games for the Forum of Cultures, Barcelona 2004, and more recently the Interactive Slide project.

He has been secretary of the Audiovisual University Institute (IUA of UPF) and head of the Interactive Systems Laboratory (IUA) until the Institute closed. Was co-founder of the group for Experimentation on Interactive Communication (IUA) and has collaborated with the group Specs (DTIC). He is teacher at the Master in Digital Arts of the IUA-IDEC, UPF. He is co-founder and scientific director of Galeria Virtual since 1993, where he has directed the technological aspects of several experimental virtual reality productions applied to contemporary art.

3.53 Prof. Niels Birbaumer

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Research

Niels Birbaumer started studying psychology, statistics and art history in 1963 at the University of Vienna. He then did his PhD between 1966 and 1969 about Eletroencephalography of blind people. After being employed at the University of Munich, he became a professor at the University of Tuebingen in 1975. In 1993, he moved from the Social and Behavioral Sciences faculty to the Medical faculty, where he leads the Institute of Medical Psychology and Behavioral Neurobiology as well as the Magnetoencephalography (MEG) Center. Prof. Birbaumer's research interests are broadly diversified. Among them is neural plasticity and learning, epilepsy, Parkinson disease and pain illnesses. His main interest during the last 15 years has been Brain-Computer Interfaces (BCI), which consists of exchanging information between brain and machines without using the limbs. This research could, for example, allow patients in final stage of Amyotrophic Lateral Sclerosis (ALS) to communicate with their environment.

3.54 Prof. Olaf Blanke

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Research

Olaf Blanke is director of the Laboratory of Cognitive Neuroscience at the Swiss Federal Institute of Technology (Ecole Polytechnique Fédérale de Lausanne; and consultant neurologist at the Department of Neurology (University Hospital of Geneva). He pioneered the neuroscientific study of human self-consciousness and subjectivity by using a broad range of methods such as the neuropsychology and electrophysiology of self-consciousness in neurological disease as well as brain imaging in healthy subjects. His main interest at present is the development of a data-driven neuroscientific theory of self-consciousness and subjectivity. Another main line of research concerns balance and body perception, and their application to engineering-based technologies such as virtual reality, robotics, and neuro-rehabilitation.

3.55 Prof. Paul Lukowicz

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Research

Our research is devoted to adaptive, intelligent systems seamlessly integrated in the environment. This includes wearable computing, sensors and sensor networks, activity and context recognition, software tools, system models, and a wide range of pervasive computing applications. We are particularly interested in large scale systems that self organize to cooperate in dynamic, opportunistic configurations. In the application area we have a strong emphasis on health and wellness related systems.

3.56 Prof. Paul Verschure

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Research

Paul received both his MA. and PhD in psychology. His scientific aim is to find a unified theory of mind, brain and body through the use of synthetic methods and to apply such a theory to the development of novel cognitive technologies.

Paul has pursued his research at different institutes in the US (Neurosciences Institute and The Salk Institute, both in San Diego) and Europe (University of Amsterdam, University of Zurich and the Swiss Federal Institute of Technology-ETH and Universitat Pompeu Fabra in Barcelona).

Paul works on biologically constrained models of perception, learning, behavior and problem solving that are applied to wheeled and flying robots, interactive spaces and avatars. The results of these projects have been published in leading scientific journals including Nature, Science, PLoS and PNAS. In addition to his basic research, he applies concepts and methods from the study of natural perception, cognition and behavior to the development of interactive creative installations and intelligent immersive spaces. Since 1998, he has, together with his collaborators, generated a series 20 public exhibits of which the most ambitious was the exhibit "Ada: Intelligent space" for the Swiss national exhibition Expo.02, that was visited by 560000 people. The most recent one was the Multimodal Brain Orchestra that premiered in the closing ceremony of the EC Future and Emerging Technologies conference in Prague in April 2009.

- Paul's ideas he is most pleased with:
- Distributed Adaptive Control: An architecture of perception, cognition and behavior
- Predictive Hebbian Learning
- Temporal Population Code - TPC

- Self-stabilizing negative feedback learning system of the cerebellum
- Rehabilitation Gaming Station - RGS
- RoBoser

Paul leads SPECS, a multidisciplinary group of 25 pre-doctoral, doctoral and post-doctoral researchers that include physicists, psychologists, biologists, engineers and computer scientists.

3.57 Prof. Patrick Haggard

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Research

Professor Haggard has two major research themes. The first is the cognitive neuroscience of voluntary action. Experiments in this theme attempt to link the subjective experience of intending and performing manual actions to the brain processes that occur before and after actual movement. The second research theme is the representation of one's own body. How does the brain create and maintain a representation of one's own body as a physical object? How is this representation influenced by current sensory inputs, such as touch and pain? How do such body representations contribute to a sense of self? These questions are addressed both in perceptual experiments, and in measures of brain activity elicited when subjects refer to a cognitive representation of the body.

3.58 Prof. Paul Sharkey

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Research

Originating from Dublin, I graduated in 1988 with an Honours Diploma in Electronic & Electrical Engineering from the Dublin Institute of Technology and with a B.Sc.(Eng.) in the same year from the University of Dublin (Trinity College) leading to an MA from Trinity in 1991. I was awarded a Ph.D. for research in the area of nonlinear control systems from the University of Strathclyde, Glasgow in 1988 and spent 5 years as a postdoctoral researcher at the Robotics Research Group of the University of Oxford researching in the areas of force control of manipulators on multiprocessor systems and active vision. The latter led to the development of the Yorick robot head series. I joined the Department of Cybernetics in 1993 as a lecturer, gaining promotion to Senior Lecturer ('97), Reader ('98) and, in June '99, Professor of Cybernetics. I chair the Interactive Systems Research Group.

3.59 Prof. Peter Robinson

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Research

Peter Robinson is Professor of Computer Technology in the Computer Laboratory at the University of Cambridge, where he leads the Rainbow Research Group working on computer graphics and interaction.

Professor Robinson's research concerns problems at the boundary between people and computers. This involves investigating new technologies to enhance communication between computers and their users, and new applications to exploit these technologies. The main focus for this is human-computer interaction, where he has been leading work for some years on the use of video and paper as part of the user interface. The idea is to develop augmented environments in which everyday objects acquire computational properties through user interfaces based on video projection and digital cameras. Recent work has included desk-size projected displays and tangible interfaces.

With rapid advances in key computing technologies and the heightened user expectation of computers, the development of socially and emotionally adept technologies is becoming a necessity. He has led investigations of the inference of people's mental states from facial expressions, vocal nuances, body posture and gesture, and other physiological signals, and also considered the expression of emotions by robots and cartoon avatars.

He has also pursued a parallel line of research into inclusive user interfaces. Collaboration with the Engineering Design Centre has investigated questions of physical handicap, and research students have considered visual handicaps. This has broader applications for interaction with ubiquitous computers, where the input and output devices themselves impose limitations.

Professor Robinson is a Fellow of Gonville & Caius College where he previously studied for a first degree in Mathematics and a PhD in Computer Science under Neil Wiseman. He is a Chartered Engineer and a Fellow of the British Computer Society.

3.60 Dr. Petros Daras

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Research

Petros Daras was born in Athens, Greece, in 1974. He received the Diploma degree in electrical and computer engineering, the M.Sc. degree in medical informatics, and the Ph.D. degree in electrical and computer engineering from the Aristotle University of Thessaloniki, Thessaloniki, Greece, in 1999, 2002, and 2005, respectively.

He is a Senior Researcher at the Informatics and Telematics Institute. His main research interests include computer vision, search and retrieval of 3-D objects, and multimedia search engines. His involvement with those research areas has led to the co-authoring of more than 12 papers in refereed journals and more than 40 papers in international conferences. He has served as a regular reviewer for a number of international journals and conferences. He has been involved in more than 15 European and National research projects. Dr. Daras is a member of the Technical Chamber of Greece.

3.61 Prof. Pietro Pietrini

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Research

Pietro Pietrini is Professor of Clinical Biochemistry and Head of the Functional Exploration of the Brain Program, University of Pisa Medical School (Italy), and coordinates a multidisciplinary integrated research group merging engineering, medical, and biological scientists. Degree in Medicine and Surgery, Board Certified in Psychiatry and Ph.D. in Neurosciences. Fields of interest: In vivo study of the neurometabolic bases of uni- and multi-sensory perception and integration, cognition and behaviour in

sighted and blind humans in physiological conditions and during neuropsychiatric processes by using positron emission tomography (PET) and functional magnetic resonance imaging (fMRI) during specific neuropsychological tasks. Over 150 papers and book chapters in peer-reviewed journals including Science, Nature, PNAS.

3.62 Prof Rafael Malach

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Research

Department of Neurobiology, Brain Sciences Program Weizmann Institute of Science. Prof Malach earned a B.Sc. in Biology and a M.Sc. in Neurobiology and received his Ph.D. in Physiological Optics. He then spent several years as a postdoctoral fellow studying neuroanatomy at the Massachusetts Institute of Technology (MIT). He is at present the Head of the Department of Neurobiology, a Kimmel investigator and the incumbent of the Barbara and Morris Levinson Professorial Chair in Brain Research. Prof. Malach has contributed to the scientific understanding of the ways in which the human brain processes sensory information.

Prof Malach Research focus on relating neuronal activity and sensory perception in the human brain aiming to build an experimentally constrained neuronal theory of human perceptual awareness.

3.63 Dr. Ralph Schroeder

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Research

Before coming to the OII Ralph Schroeder was Professor in the School of Technology Management and Economics at Chalmers University in Gothenburg. He completed his Ph.D. on Max Weber at the LSE in 1988. He has written extensively about virtual reality technology and is now synthesizing this research in a book that will link how people interact in virtual environments to other types of computer-mediated communication and new media. He has also done work in the sociology of science and technology and recently completed a book entitled 'Rethinking Science, Technology and Social Change'. His current research is mainly on a number of projects related to e-science.

3.64 Dr. Randolf Schultz

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Research

Dr. Randolf Schultz got a Masters Degree (Diploma) in Computer Science from the University of Rostock in 1997 and a PhD (Dr.-Ing.) in Computer Science in 2002 (University of Rostock). Since 2003 he is researcher at Fraunhofer IGD Rostock, focusing his work on complex user tracking and visualisation as well as analysis of the human machine interaction. Further research interests include user interfaces for 3D modelling and virtual reality and rendering.

3.65 Mr. Renato Pellegrini

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Research

Sonic Emotion has its major focus on 3D sound reproduction systems. With our expertise on auditory virtual environments (binaural and wave field synthesis reproduction) we have learned a lot about the sense of presence in interactive virtual environments. This know-how is used for

- Virtual reality simulation (airplanes, in-car, trains)
- Interactive sound installations (museums, dance theaters, theme parks)
- Individual augmented reality systems.

Although we run a business rather than being a university, we do research together with our scientific partners at IRCAM (France), TU-Dresden (Germany), TU-Berlin (Germany), EPFL Lausanne (Switzerland). It is through those connections that we also publish scientific research.

3.66 Prof. Roger M. Whitaker

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Research

My research focuses on the intelligent design and use of networks for content provision. This involves a range of areas including:

- intelligence: meta-heuristics, agents, emergent behaviour, cognitive processes;
- content provision: cooperation, trust, relevance, social networks, geo-spatial information;
- mobile and pervasive technologies: 2G, 3G and 4G systems, peer-to-peer networks, opportunistic networks.

These activities are inherently interdisciplinary and involve considerable collaboration with a range of other subjects.

3.67 Prof. Salvatore Maria Aglioti

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Research

S. M. Aglioti holds the possition of professor of Cognitive Neuroscience and Psychological Physiology, Sapienza University of Rome, Italy. Currently he works as a director of four laboratories at IRCCS Fondazione Santa Lucia.

- Somatosensory Evoked Potential (SEPs)
- Laser Evoked Potentials (LEPs)
- Transcranial magnetic stimulation (TMS)
- High-precision eye-tracker registration

Prof Aglioti research interests focus on the psychological and underlying neural processes of:

- Normal and abnormal functioning of social interactions, empathy and personality neural basis of corporeal awareness in healthy and brain damaged patients
- Sensorimotor processing in expert brains including elite athletes and musicians
- Voluntary action and bodily sensations in healthy humans and brain damaged patients

3.68 Dr. Shwetak Patel

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Research

Shwetak N. Patel is an Assistant Professor in the departments of Computer Science and Engineering and Electrical Engineering at the University of Washington. His research interests are in the areas of Human-Computer Interaction, Ubiquitous Computing, and User Interface Software and Technology. He is particularly interested in developing easy-to-deploy sensing technologies and approaches for activity recognition and energy monitoring applications. He is also interested in exploring novel interaction techniques for mobile devices, mobile sensing systems, and wireless sensor platforms. Dr. Patel's most recent research has been in building a new class of low-cost and easy-to-deploy sensing systems for the home, called Infrastructure Mediated Sensing, which leverages existing utility infrastructures in a home to support whole-house sensing.

Dr. Patel was also a founder of Zensi, Inc., a demand side energy monitoring solutions provider, which was acquired by Belkin, Inc in 2010. He received his Ph.D. in Computer Science from the Georgia Institute of Technology in 2008 and B.S. in Computer Science in 2003. Dr. Patel received the MacArthur Foundation Fellowship in 2011, received the TR-35 award in 2009, was named top innovator of the year by Seattle Business Magazine, was name Newsmaker of the year by Seattle Business Journal, and was a recipient of the Microsoft Research Faculty Fellowship in 2011. His past work was also honored by the New York Times as a top technology of the year in 2005.

3.69 Dr. Sid Kouider

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Research

Sid Kouider is a cognitive neuroscientist working on the neurobiological and psychological foundations of consciousness. After a Master's degree in cognitive psychology, he did his doctorate on subliminal language perception under the supervision. Right after completion, Koudier left for Harvard University to do a post-doc on the development of linguistic and conceptual abilities in babies. He came back to Paris during 2003 and started a second post-doc on brain imaging and consciousness. Since 2005, Koudier has held a permanent CNRS researcher position and has been working at the Ecole Normale Superieure in Paris. Koudier is also affiliated with the Cognitive Neurologico Unit located in the NeuroSpin centre near Paris and where he usually performs brain imaging experiments.

Koudier is mainly interested in how conscious and unconscious processes differ at both the psychological and neural level. He uses various behavioral and brain imaging methods (e.g., fMRI and EEG/EMG) to study how humans process things unconsciously (e.g., such as in situations of subliminal perception) and compare it to situations of conscious processing. This approach offers the opportunity to understand the functional and physiological specificity of consciousness and, ultimately, why we need both conscious and unconscious processing. Recently, Koudier has extended this line of research to study the neural correlates of consciousness in pre-linguistic babies.

3.70 Dr. Slawomir Nikiel

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Research

Dr. Slawomir Nikiel is an Assistant Professor at the Institute of Control and Computation Engineering, University of Zielona Góra. He started working with computer graphics in 1995. His current research interests are focused on image synthesis for real-time computer graphics and virtual environments (mostly for Digital Cultural Heritage projects). One of the topics is to provide intuitive tools for virtual representation of natural phenomena with the development of better modelling algorithms that increase the complexity of computer-generated scenes. His research interests include the fields of mobile media and fractal imaging.

3.71 Mr. Steffen Mader

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Research

Steffen MADER joined the Fraunhofer Institute for Computer Graphics (IGD) in 1997. During the years, he was working in several research projects in the areas of Image Processing and Computer Vision as well as 3D Visualization, Virtual and Augmented Reality. Since its formation in 2001 he is working with the “Human-Centered

Interaction Technology" research group, which focuses on the capturing, recognition, and interpretation of human affective states. One of his current projects is the design and implementation of an extensible and freely configurable middle-ware framework supporting the processing of human affect-related data and supporting an easy set-up and modification of affective computing applications from a set of components. His interests are further in visualization in general and specifically in visualization of affect related data.

3.72 Prof. Stephane Bouchard

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Research

Stéphane Bouchard received is Ph.D. at the Université Laval in 1995. During the same year, he finished his first year of post-Doctoral studies and was hired by the Université du Québec en Outaouais. His work revolves around the effectiveness of cognitive-behavioral therapy in the treatment of anxiety disorders and the mechanisms underlying its effectiveness. For the past few years, he is specializing in the use of virtual reality and telepsychotherapy delivered through videoconferencing. He continues to occupy a vital leadership position within the Cyberpsychology Lab, thanks to on going close collaboration with other research team members (publications, etc.) and his international collaborations.

Through his relatively short career, Dr Bouchard as received many prizes and honors, notably the Award of the Canadian Research Chairs Program in Clinical Cyberpsychology in 2003 and the award from the Canadian Psychological Association, in 1995, in recognition of his exceptional contribution to the knowledge of psychology as a new researcher. He has already produced numerous publications to his credit and received many kinds of research grants. His current research projects focus in the treatment of specific phobias (e.g. flying phobia) and other more complex anxiety disorders (social anxiety, panic disorder, etc.), in the predictors underlying the effectiveness of telepsychotherapy (e.g. therapeutic alliance and motivation) and of virtual reality (e.g. sense of presence, role of emotions).

3.73 Prof Tamar Flash

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Research

Prof Flash research is focus on motor control in humans and robotic systems. This research combines experimental work in human subjects with the development of mathematical models that formulate alternative hypotheses concerning motion planning and control strategies by the brain. This combined research helps in gaining insight into human motor control and serves the development of motion planning and control algorithms for artificial robotic systems. In particular, together with colleagues Prof Flash studies the principles that underlie the selection and planning of human 2D and 3D arm movements during reaching, drawing and grasping tasks. The comparison of motor performance in neurologically healthy human subjects with that of patients suffering from various movement disorders contributes to the understanding of the pathophysiological processes underlying such disorders.

One of Prof Flash current interests is in the topic of motor learning in humans and in the development of learning capabilities for robotic systems. Another current interest is in developing mathematical formalisms based on differential geometry and Lie Algebra to investigate motion planning strategies and the resolution of task and kinematic redundancy problems associated with multi-degrees of freedom moments in biological and robotic systems. An additional current interest is in investigating the neural control of flexible hyper-redundant arms as in the Octopus.

3.74 Prof. Tassos A. Mikropoulos

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Research

Professor Anastassios Mikropoulos is the head of Educational Approaches to Virtual Reality Technologies Laboratory, Information Technologies and Virtual Reality in Education. Members of the lab are scientists specialized in various disciplines, research associates and postgraduate students. The lab has an interdisciplinary approach with research interests in Presence Factors that Influence Learning Outcomes in Educational Virtual Environments.

- Virtual Environments as mindtools
- Educational Virtual Environments
- Features of Educational Virtual Environments
- Presence in Educational Virtual Environments
- Objective Presence Measures through Electric Brain Activity

3.75 Prof. Thomas Metzinger

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Research

Thomas Metzinger holds the position of director of the theoretical philosophy group at the department of philosophy at the Johannes Gutenberg University of Mainz and is an Adjunct Fellow at the Frankfurt Institute for Advanced Studies. From 2008 to 2009 he served as a Fellow at the Wissenschaftskolleg zu Berlin.

He has been active since the early 1990s in the promotion of consciousness studies as an academic endeavour. As a co-founder, he has been particularly active in the organization of the Association for the Scientific Study of Consciousness (ASSC), and sat on the board of directors of that organisation from 1994 to 2007. He served as president of the ASSC in 2009/10. Metzinger is director of the MIND group and has been president of the German cognitive science society from 2005 to 2007. In English he has published two edited works, *Conscious Experience* (1995), and *Neural correlates of consciousness: empirical and conceptual issues* (2000). The latter book arose out of the second ASSC meeting, for which he acted as local organizer.

In 2003 Metzinger published the monograph *Being No One*. In this book he argues that no such things as selves exist in the world: nobody ever had or was a self. All that exists are phenomenal selves, as they appear in conscious experience. He argues that the phenomenal self, however, is not a thing but an ongoing process; it is the content of a "transparent self-model." In 2009 Metzinger published a follow-up book to *Being No One* for a general audience: *The Ego Tunnel*.

Metzinger's work addresses some of the fundamental issues in neurobiology, consciousness, and the relationship between mind and body. His views about the self are the subject of considerable controversy and ongoing debate.

Metzinger's interests include:

- Philosophy of mind (esp. philosophical aspects of empirical theories in the neuro- and cognitive sciences, artificial intelligence, and related areas of research).

- Ethics (esp. conceptual connections between applied ethics, the philosophy of mind and anthropology).

3.76 Prof. Tom Rodden

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Research

Tom Rodden is Professor of Interactive Systems at the Mixed Reality Laboratory (MRL) at the University of Nottingham and Director of Equator. Prof Rodden's research focuses on the development of new technologies to support users within the real world and new forms of interactive technology that emerge from mixing physical and digital interaction. This is a multi-disciplinary endeavour bringing together researchers in behavioural and social sciences and those involved in systems engineering, network infrastructures and interactive systems design. This ranges from those with a background in anthropology to those with training in art & design and embrace technologists from software development to the construction of novel hardware. He has published widely in the areas of Computer Supported Cooperative Work (CSCW), HCI and Ubiquitous computing. Since 2001 he has been director of the Equator IRC that brings together 8 different research institutes in the UK. The Equator IRC is a six-year programme of research to explore new technologies that interweave the physical and digital worlds supported by the UK's Engineering and Physical Sciences Research Council (EPSRC).

3.77 Dr. Ulysses Bernardet

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Research

Dr. Ulysses Bernardet has done his PhD in psychology at the Institute of Neuroinformatics, University of Zurich/Swiss Federal Institute of Technology in Zurich, Switzerland, and has an M.S. in psychology, computer science and neurobiology from the University of Zurich.

His research is driven by the overarching goal of contributing to ground psychology in neurobiology. He is convinced that this goal can only be achieved by firstly employing large-scale, biologically grounded models of neuronal systems and secondly by studying "simple systems". For these reasons Ulysses was the main developer of the large-scale systems simulator iqr, has developed a novel robotic platform dubbed "Strider", and in his PhD has studied the neuronal basis of navigation and behavior regulation in insects.

At the core of Ulysses current research interests stands the development of the "Homo Syntheticus" (HS). This project aims at building "situated" models of human cognition, emotion, and behavior, i.e. models that are interacting with (biological) humans in real-time by means of virtual humans or robots. The models HS are based on a systems theoretical approach, and focus on the motivational system. Emotion in HS are seen as mechanism of appraisal of sensory information, and intrinsic means to convey deviations in the motive system to the individual.

3.78 Dr. Verónica Costa Orvalho

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Research

Verónica Costa Orvalho born in 1976, mother of a lovely boy. Holds a Ph.D. in Software Development (Computer Graphics) from Universitat Politècnica de Catalunya (2007), where her research centred on "Facial Animation for CG Films and Videogames". She has been working in IT companies, such as IBM and Ericsson, and Film companies, such as Patagonik Film Argentina since 1994. She has given many workshops and has international publications related to game design and facial animation in conferences like SIGGRAPH and Symposium in Computer Animation. She has received international awards for several projects: "Photorealistic facial animation and recognition", "Face Puppet" and "Face In Motion".

Now, she is a full time professor of Porto University, head of the Porto Interactive Center and Computer Graphics group, and co-founder and CTO of Face In Motion. She is also a former research member at the Event Computational Lab working on virtual reality and character animation. Current and past collaborations include several film and game companies (Blur Studios, Electronic Arts, Microsoft Portugal, Dygra Films), and research groups (Stanford University, Universitat Politecnica de Catalunya). Her current research focus on developing new methods related to motion capture, geometric modeling and deformation, and real time animation.

Costa Orvalho main research interest is Applied Computer Graphics for medical and entertainment industry.

- Computer Animation
- Geometric Modeling and Deformation
- Human-Computer Interaction

3.79 Prof. Yvonne Rogers

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Research

Professor Rogers researches and teaches in the areas of HCI, ubiquitous computing and CSCW. A particular focus is augmenting and extending everyday learning and work activities with novel technologies. This involves designing enhanced and engaging user experiences through using a diversity of technologies, including mobile, wireless, handheld and pervasive computing.

4 PROJECTS

The following EU projects are just some of the more relevant project currently runnning where the people listed below are carrying out HCC relevant research. Only CEEDS and VERE are part of the HCC cluster.

See here for more information on this area:

http://cordis.europa.eu/fp7/ict/fet-proactive/hcco_en.html

4.1 BEAMING

http://beaming-eu.org/

BEAMING is the process of instantaneously transporting people (visitors) from one physical place in the world to another (the destination) so that they can interact with the local people there. This is achieved through shifting their means for perception into the destination, and decomposing their actions, physiological and even emotional state into a stream of data that is transferred across the Internet.

Simultaneous streams of data from the destination site to the visitor's perceptual apparatus, and from the actions and state of the visitor to the destination site, cohere together to form a unified virtual environment representing the physical space of the destination in real-time – a destination that now includes the beamed people. BEAMING will endow this process with physicality.

The visitor's actions at the destination site can have physical consequences; the actions of local people at the destination site can have physical consequences for the visitor. The visitor may be embodied at the destination site as a physical robot, and yet be seen by the locals virtually in human form.

This project will bring today's networking, computer vision, computer graphics, virtual reality, haptics, robotics and user interface technology together in a way that has never been tried before thereby transcending what is possible today. The goal is to produce a new kind of virtual transportation, where the person can be physically embodied interacting with life-sized people who may be thousands of kilometres away. Moreover, this is underpinned by the practical utilisation of recent advances in cognitive neuroscience in understanding the process whereby the brain represents our own body.

The project brings technology researchers together with neuroscientists in order to develop and understand this complex but far reaching technology. The profound ethical and legal issues raised by a (near) future world in which this will be possible are considered in a dedicated work package

4.2 CEEDS

http://ceeds-project.eu/

The Collective Experience of Empathic Data Systems (CEEDs) consortium advances a novel integrated technology that support experiencing, analysing and understanding of massive dataset.

Making use of humans' implicit processing abilities: CEEDS will develop innovative tools to exploit theories showing that discovery is the identification of patterns in complex data sets by the implicit information processing capabilities of the human brain. Implicit human responses will be identified by the CEEDs system's analysis of its sensing systems, tuned to users' bio-signals and non-verbal behaviours. By associating these implicit responses with different features of massive datasets, the CEEDs system will guide users' discovery of patterns and meaning within the datasets.

Immersion in synthetic reality spaces: To achieve this goal, users will be immersed in synthetic reality spaces (SRS), allowing them to explore complex data whilst following narrative structures of varying spatio-temporal complexity. Unobtrusive multi-modal wearable technologies will be developed in the project for users to wear whilst experiencing the SRS. These will provide an assessment of the behavioural, physiological and mental states of the user.

Two brains are better than one – collective experience: Individuals' pattern detection abilities will be augmented by linking multiple users together, creating a collective discovery system. Components of the CEEDs system will be integrated using generalized architectures from network robotics, creating a genuinely novel approach to massive distributed synthetic reality applications.

Making a practical difference: CEEDs' effectiveness will be validated through studies involving stakeholders from science, history and design. The consortium envisages genuine benefits from the CEEDs system. Think, for example, of a young pupil using CEEDs being able to see complex patterns in an astronomy data set, patterns which without CEEDs would only be perceptible to an experienced professor. By unleashing the power of the subconscious, CEEDs will make fundamental contributions to human experience. When we look back to life before CEEDs, we may liken our experience to living with our eyes closed.

Enriching theory across disciplines: On the theoretical level, CEEDs targets a novel integrated computational and empirical framework, merging the delivery of presence with the study of consciousness, its underlying sub-conscious factors and creativity. To do this,CEEDs will follow a multi-disciplinary approach that will significantly further the state of the art across science, engineering and the humanities. By bringing together a team of leading experts in psychology, computer science, engineering, mathematics, and other key disciplines, CEEDs will build the foundations for key developments in future confluent technologies.

4.3 HIVE

http://hive-eu.org/

HIVE is a 4 year project [2008-2012] funded by the European Commission and coordinated by Starlab under the Future Emerging Technologies (FET Open) - Information and Communication Technologies (ICT) program nursery of novel and emerging scientific ideas.

The project will address the following crucial related gaps in current non-invasive brain stimulation science and technology:

Poor understanding of the effects of stimulation at the neuron and neuronal ensemble level: the project will investigate the biophysics of stimulation at the theoretical, computational and experimental level—both in humans and animals.

Unfocused, un-precise stimulation technologies: an important objective of this project is to develop new multisite electromagnetic non-invasive stimulation paradigms to implement more controllable and effective stimulation technologies and applications. The project will develop a Multisite transcranial Current Stimulation and monitoring prototype (MtCS) for finer control of current flows in the brain and subsequently explore related applications.

Limited animal and human stimulation experimental work: the project will explore new stimulation paradigms to communicate and interact with neural ensembles and the human brain.

4.4 VERE

http://www.vereproject.eu/

The VERE project is concerned with embodiment of people in surrogate bodies so that they have the illusion that the surrogate body is their own body – and that they can move and control it as if it were their own. There are two types of embodiment considered - robotic embodiment, where the person is embodied in a remote physical robotic device, and which they control through a brain-computer interface. For example, a patient confined to a wheelchair or bed, and who is unable to physically move, may nevertheless re-enter the world actively and physically through such remote embodiment. The second type of embodiment is virtual where participants enter into a virtual reality with a virtual body representation. The basic and practical goal of this type of embodiment is to explore its use in the context of rehabilitation settings. Underlying these practical considerations is fundamental scientific research across a range of topics that are core to the progress of the practical goals: the neuroscience of body ownership, the construction of a machine to accomplish embodiment that reads signals from the participant and delivers virtual sensory data to the participant, the

recognition of intentions through the monitoring of brain and physiological signals, the embodiment of these intentions into actions by a physical robot and the representation of participants by such a robot, the technology underlying virtual embodiment, and an overall software platform in which the different streams of work can be developed. There are two applications, one for immobile patients based on physical embodiment, and another for rehabilitation and training based on virtual embodiment. A critical part of the research is the consideration of the philosophical and ethical principles underlying embodiment, and consequently there is an entire stream of work that acts as the ethical and philosophical conscience of the project.

During the first year a number of goals of the project have been realised - studies involving the brain representation of embodiment at various levels, the design of an 'embodiment station', the first results on intention recognition using a variety of techniques based on both EEG and fMRI signals, the implementation of robots controlled through a brain-computer interface, and technical advances in the virtual reality representation of individuals. There has also been progress in research leading to the applications - including results showing that embodiment influences social attitudes, and progress on each of the fronts mentioned above.

A major and prestigious seminar was held in Centro Stefano Franscini, Monte Verità, Ascona, Switzerland, 26th September to 1st October, 2010, called 'Body Representation in Physical and Virtual Reality with Application to Rehabilitation' which was organised by the VERE coordinator, another PI of VERE together with another expert on rehabilitation, at which many of the VERE PIs presented their work. Another event was organised by a PI of VERE at the American Association of the Advancement of Science which was held in February 2011: "From Artificial Limbs to Virtual Reality: How the Brain Represents the Body". As well as this meeting being organised by one of the VERE PIs who also spoke at this meeting, the VERE Coordinator presented at this meeting.

5 COMPANIES

The following companies devleop products related to HCC.

5.1 Immersion

http://immersion.fr/

Immersion is the European specialist for tailored turnkey visual simulation and virtual reality solutions.

Immersion designs new solutions and methods of interaction and visualization for the future multimodal virtual environments, and delivers stereoscopic display rooms, high pixel-density image walls, multiface immersive environments and real-time 3D visual simulators.

The company brings a unique end-to-end support to its customers throughout the project life. Immersion references include famous brands such as LVMH, PSA Peugeot Citroën, Renault, CEA, IRIT, the LABRI, the French Air Army, EADS Astrium, Airbus, Eurocopter and CS.

5.2 Softkinetic

http://www.softkinetic.com/

SoftKinetic's vision is to transform the way people interact with the digital world. They are the leading provider of gesture-based platforms for consumer electronics and professional markets. The company offers a complete family of 3D imaging and gesture recognition solutions, including patented 3D CMOS time-of-flight sensors & cameras (DepthSense™ family of products, formerly Optrima technology), multi-platform and multi-camera 3D gesture recognition middleware and tools (iisu™ family of products), as well as games and applications from SoftKinetic Studios.

With over 8 years of R&D on hardware & software, SoftKinetic's solutions have already hugely been successfully used in the field of interactive digital entertainment, consumer electronics, health care and other professional markets including digital signage and medical systems.

SoftKinetic™, iisu™, DepthSense™ and Interface Is You™ are trade names or registered trademarks of SoftKinetic.

5.3 Starlab

http://starlab.es/

Starlab's mission is to transform science into technologies with a profound positive impact on society. Our vision is to make science more useful, alive, vibrant, faster.

As market-oriented scientists, we believe that the potential for innovation is greater when we rethink the basics together with our clients. We build on scientific research and sound engineering to deliver disruptive solutions.

Our main areas of work lie in the Space and Neuroscience sectors, two key areas for the 21st century with on a common element: the increasing availability of streams of information. We provide technical solutions, products and services for governments, industry and downstream markets.

We are market-aware and market-driving: Space (technology and EO Services) and Neuroscience research will have great impact in and through several key markets, including environment, energy, health and space.

Through various EU funded projects we carry out research in BCI, CBI, Brain Stimulation, affective BCI and electrophysiological biometry.

Starlab is a private company, founded in 2000.

5.4 Sony CSL

http://www.csl.sony.fr/

The Sony Computer Science Laboratory in Paris engages in fundamental research in cutting edge areas of science that are relevant for pushing the state of the art in computing. It is a sister laboratory of the Sony Computer Science Laboratories in Tokyo and directed by prof. Dr. Luc Steels.

5.5 Dassault systemes

http://www.3ds.com/

Dassault Systèmes, worldwide leader in 3D solutions, has revolutionized the industry and the Product Lifecycle Management (PLM) with its software for design, simulation and collaboration in 3D. The company's new challenge is to put its know-how and 3D

lifelike experience technologies at the heart of the relationship between brands, products and consumers.

Dassault Systèmes has designed and developed new marketing tools based on full immersion, interactivity, involvement of the spectator into the content to offer a series of innovative experiments that place the user at the heart of the 3D experience.

Experiential 3D, an interactive media with new dimensions

The applications of interactive 3D beyond the world of industry and video game are endless. In the late 90s, the challenge for advertisers was to ensure their presence on the Internet in 2D. Their new challenge is to reinvent the rules of interaction with consumers, involving them more in their brand's world through multichannel emotional experiences. This new challenge requires experiential 3D which allows, from an advertiser's single virtual world, to imagine new forms of multi-platform experiences, whether individual or collective, through Internet devices or through the most complex virtual and augmented reality systems, using game consoles, 3D screens or even movie theatres.

6 FUNDING

6.1 ICT

Currently the main source of funding for what we consider HCC is the FET proactive area work programme that funds our project.

FET Proactive http://cordis.europa.eu/fp7/ict/fet-proactive/hcco_en.html

However, other ongoing projecs that deal with HCC themes are funded under:

FET Open http://cordis.europa.eu/fp7/ict/fet-open/home_en.html

ICT http://cordis.europa.eu/fp7/ict/home_en.html

In the upcoming FET Flagship programme a number of HCC relevant projects have been proposed including:

The Human Brain Project: http://www.humanbrainproject.eu/

Robot Companions http://www.robotcompanions.eu/home