“Smart” Implants

Therapeutic Solutions

Security

Human Enhancement

Wellcome Collection Conference Centre, 20th October 2011

20 October 2011

Dear colleague

We are delighted to welcome you to this masterclass on ‘smart implants’. The event is part of the work programme of the ICT Ethics project, funded by the European Commission, in which Cesagen (the ESRC Centre for Economic and Social Aspects of Genomics) at Lancaster University is a partner. Today’s workshop has also received funding from another European project, GLEUBE (Globalising European Bioethics Education). The latter project is co-ordinated by Mark Cutter at University of Central Lancashire.

The potential implications and applications of smart implants have the potential to be realised in a number of domains and as yet the discussion of the social aspects is still at a relatively early stage, as compared with other emerging technologies. We are delighted that key players will be speaking here today and look forward to stimulating and thought-provoking discussions.

Do not hesitate to let the organising team know if we can help you in any way, and thank you in advance for your contribution.

Kind regards

Ruth Chadwick

Mark Cutter

Ruth Chadwick
Director Cesagen

“Smart” implants: therapeutic solutions, security and human enhancement

Date: 20th October 2011
Duration: 09:45 – 16:30
Location: Wellcome Collection Conference Centre, Dale Room
183 Euston Road, London NW1 2BE

Programme of the meeting:

09:45 – 10:00 **Welcome tea / coffee**

Session 1 – ICT innovations: hype, hope and accountability

10:00 – 11:00

Introduction by the organisers
The **ICTethics** and **Gleube** projects.

Title: Aims and objectives of the day

Chris Evett and **Jes Odedra**
UK Ministry of Defence, Strategic Trends Programme

Title: Global Trends - Planning for the Future

Questions, discussion & debate

This session will provide an opportunity to explore the role of “horizon scanning” in preparing and planning for the future. It is an opportunity to ask, among other things, who the authors are, to what extent the envisioned developments are taken for granted, e.g., implant technology, human-machine interfacing, advanced bionics, and what can be learned from our expectations and attitudes.

11:00 – 11:15 **Refreshment break**

Session 2 – Brains and bodies: what does the future hold in store for us?

11:15 – 12:45

Simon Schultz
Imperial College, London

Title: Accessing the brain: a view from Imperial College

In this talk I will describe the Neurotechnology Initiative recently launched by Imperial College London. The main goal of the Initiative is to develop new approaches for interacting with the nervous system, both for understanding the brain and for therapeutic purposes. A key feature of our centre is the presence of engineers and neuroscientists working alongside each other in the laboratory, something unusual elsewhere. I will describe our recent successes, our current foci, and what we see as the brightest prospects for future neurotechnologies.

Ian Harrison
Reading University, UK

Title: Self-Experimentation, Implants and the Future

This talk is about self experimenters, various implants and future possibilities, whilst bearing in mind the hold-ups and challenges that researchers have to overcome. This talk will have a first person perspective on self-experimentation as well as providing the 3rd person perspective of the absentee, Professor Kevin Warwick.

Questions, discussion & debate

Session 2 will provide an opportunity to explore cutting edge developments in research and experimentation. It is an opportunity to ask, among other things, how experimenters and leading researchers see ethical, social and cultural relevance in the work they do, how they see the future, what promises and complications it may hold in store.

12:45 – 13:30 LUNCH

Session 3 – ICT implants: experimentation, therapy, security

13:30 – 15:00

James Giordano
Center for Neurotechnology Studies, Potomac Institute of Policy Studies, USA

Title: Implantable neurotechnologies and neurosecurity: Practical issues, neuroethical considerations

Implantable neurotechnologies offer unique potential to affect neuro-cognitive and behavioral functions, and are therefore promising approaches in mitigating the effects of certain neurological and psychiatric disorders. These technologies can also be used to augment or alter human cognitive, emotional, and motor performance. The nascence of such technology dictates address of possible technical/biological capabilities and limitations, and the scope of effect mandates neuroethical, legal and social considerations regarding the utility and potential misuse in national security and defense agendas. These factors are addressed relevant to the importance, directions, and governance of ongoing research.

Juliet Lodge
Leeds University, UK

Title: ICT implants : steering behaviour?

This discussion focuses on the therapeutic and tracking possibilities of ICT implants. It raises a number of issues regarding alternative use scenarios.

Questions, discussion & debate

Session 3 will provide an opportunity to explore medical-therapeutic purposes of implant technology as well as behaviour and security purposes. It is an opportunity to ask, among other things, what the tensions are between utility and misuse, management and unintended consequence, vision and reality.

15:00 – 15:15 Refreshment break

Session 4 – Panel discussion and debate

15:15 – 16:30

Daniela Cerqui, University of Lauzanne, Switzerland.
Ruth Chadwick (Panel Chair), Cesagen, Cardiff and Lancaster Universities, UK.
Martyn Bracewell, NICE – Medical Technologies Advisory Committee.
Anders Sandberg, Future of Humanity Institute, Oxford, UK.

This session will begin with each panel member taking 5-8 minutes to reflect on his/her observations over the course of previous sessions. Each member reserves the integrity of his/her respective expertise, interests, experiences, etc... to draw together what they see as the "key learnings" or the “hot topics” of the day. Thereafter, the floor is open to challenge panel members and engage in further discussion and debate.

Speakers

Chris Evett and **Jes Odedra** are contributing authors of the UK MOD Global Strategic Trends - Out to 2040, a high level strategy document used to inform the strategic context for the UK National Security Strategy and the Strategic Defence and Security Review. Besides their strategic futures thinking capacity, they have also been part of several MOD joint collaborative initiatives with international defence and security policy makers, senior military staff and think-tanks, seeking non-Western perspectives on variety of global issues and their implications.

Dr **Simon Schultz** studied Physics and Electrical Engineering at Monash University in Australia, before obtaining his D.Phil. from Oxford University under the supervision of Professor Edmund Rolls, for work on information processing in the mammalian cerebral cortex. He spent four years at New York University as a Howard Hughes Medical Institute postdoctoral fellow with Professor JA Movshon, using both experimental (microelectrode recording) and theoretical approaches to study the primate visual system. He is interested in how sensory information is encoded and processed by neural circuits in the cerebral cortex. His laboratory at Imperial College London, is presently engaged in two broad streams of research activity. The first, which is theoretical, involves the development of methods based on information theory for analysing data recorded from many neurons simultaneously. The second, which is experimental, involves using electrophysiological and optical (two-photon imaging) recording approaches to study the neural coding of sensory information in the mouse cortex.

Professor **James Giordano** is Director of the Center for Neurotechnology Studies of the Potomac Institute for Policy Studies, Arlington, VA, USA; Research Professor of Neuroscience and Ethics in the Department of Electrical and Computational Engineering, University of New Mexico, Albuquerque NM, USA, and is a Senior Research Associate of the Oxford Centre for Neuroethics, University of Oxford, UK. As well, he is 2011-2012 Fulbright Professor of Neurotechnology and Neuroethics at the Ludwigs Maximilliam Universitaet, Munich, Germany. His ongoing research addresses advancements in neuroscience and neurotechnology, and neuroethical issues arising in and from research in these fields, and their applications in medicine, public life and national security and defense.

Ian Harrison completed his BS degree in Biomedical Engineering and Cybernetics at Reading University. He continues to study at Reading and is currently working towards a PhD degree with the world-renowned Professor, Kevin Warwick. Warwick is both supervising and collaborating with Harrison, whose research involves looking into intimate Man-Machine Interfacing. Harrison underwent implant surgery to become a self-experimenter in this area. The implants are cylindrical magnets embedded in his fingertips. Harrison hopes to continue working with Warwick in the future, looking into organ prosthesis.

Juliet Lodge is Professor and Co-Director of Jean Monnet European Centre of Excellence University of Leeds (UK), and Research Associate of the Centre for Cybercrime and Security, University of Newcastle (UK). Her current research focuses on biometrics and ICTs, and their impact on human security, ethics and society; interoperability for internal and external security, judicial and civil cooperation; privacy, border management and cross border information exchange. She has presented evidence on these issues on many occasions, such as national parliamentary scrutiny committees and to the European Parliament.

Panel Members

Dr R **Martyn Bracewell** is Senior Lecturer in Neurology and Neuroscience at Bangor University, UK, and Consultant Neurologist to the Walton Centre for Neurology and Neurosurgery, Liverpool, UK and the Betsi Cadalwadr University Health Board, Wales,UK. He obtained his BA, MA and BM BCh degrees from Oxford University and his PhD in Brain and Cognitive Sciences from the Massachusetts Institute of Neurology. He did his postgraduate training in Medicine and Neurology at Oxford, the National Hospital for Neurology and Neurosurgery, London, and the University of Birmingham (where he was the Lecturer in Neurology). He was elected Fellow of the Royal College of Physicians of Edinburgh in 2006. His clinical and research interests include higher order sensory processing, sensorimotor control, brain stimulation techniques and novel approaches to neuro-rehabilitation.

Dr **Daniela Cerqui** is a social and cultural anthropologist interested in the relationship between technology and society (and, more fundamentally, humankind). She is a senior lecturer at the Institute of Social Sciences of the University of Lausanne (Switzerland) where she is involved in teaching and research on the new information technologies, and on the 'information society' they are supposed to create. In such a society computers are more and more integrated everywhere in our environment ('pervasive computing'). Furthermore, chips and human bodies are merging and such a symbiosis has consequences for the future of humankind. She spent two years doing a full-time research in the Department of Cybernetics of the University of Reading - where Prof. K. Warwick is merging human beings and computers - and she is still closely working with him in order to identify the social and ethical issues.

Ruth Chadwick (*Panel Chair*) is Director of the ESRC (Economic and Social Sciences Research Council) Centre for Economic and Social Aspects of Genomics (Cesagen), Cardiff University, UK. She also holds a Link Chair between Cardiff Law School and the School of English, Communication and Philosophy (ENCAP). She has co-ordinated a number of projects funded by the European Commission, including the EUROSCREEN projects (1994-6; 1996-9) and co-edits the journal *Bioethics* and the online journal *Genomics, Society and Policy*. She is Chair of the Human Genome Organisation Ethics Committee and has served as a member of several policy-making and advisory bodies, including the Panel of Eminent Ethical Experts of the Food and Agriculture Organisation of the United Nations (FAO), and the UK Advisory Committee on Novel Foods and Processes (ACNFP). She was editor-in-chief of the award winning *Encyclopedia of Applied Ethics* (1998), of which a second edition is now being prepared. She is an Academician of the Academy of Social Sciences and a Fellow of the Hastings Center, New York; of the Royal Society of Arts; and of the Royal Society of Medicine. In 2005 she was the winner of the World Technology Network Award for Ethics for her work on the relationship between scientific developments and ethical frameworks.

Dr **Anders Sandberg's** research at the Future of Humanity Institute centres on societal and ethical issues surrounding human enhancement and new technology, as well as estimating the capabilities and underlying science of future technologies. Topics of particular interest include enhancement of cognition, cognitive biases, technology-enabled collective intelligence, neuroethics and public policy. He has worked on this within the EU project ENHANCE, where he also was responsible for public outreach and online presence. Besides scientific publications in neuroscience, ethics and future studies he has also participated in the public debate about human enhancement internationally. Anders also holds an AXA Research Fellowship.

He has a background in computer science, neuroscience and medical engineering. He obtained his Ph.D. in computational neuroscience from Stockholm University, Sweden, for work on neural network modeling of human memory. He has also been the scientific producer for the major neuroscience exhibition "Se Hjärnan!" ("Behold the Brain!"), organized by Swedish Travelling Exhibitions, the Swedish Research Council and the Knowledge Foundation that toured Sweden 2005-2007. He is co-founder and writer for the think tank Eudoxa.

Other participants and organisers

Dr **Helen Bodmer** is Head of the MRC and Health Research Team at the Department for Business Innovation & Skills. She is also a Policy Fellow of the Centre for Science and Policy at Cambridge University. Helen's role as Head of the MRC and Health Research Team includes being the Departmental lead for policy on academic medical research and matters relating to the Medical Research Council (MRC) and the Office for Strategic Coordination of Health Research with high level strategic overview of publicly funded medical research in the UK. She also has responsibility for sponsorship and performance management of the MRC.

Helen works closely with colleagues in her unit which covers all areas of scientific research as well as with the Office for Life Sciences in BIS and other Government Departments, especially the Department of Health and the Home Office. In addition to this she is the UK Delegate for the IDEAS programme (FP7) for the European Research Council.

Helen's background is as an immunologist and rheumatologist and prior to her current post she spent four and a half years as an Inspector in the Home Office Animals (Scientific Procedures) Inspectorate.

In her Policy Fellowship. as well as meeting senior figures in the School of Clinical Medicine and health-related disciplines, Helen is also keen to meet senior researchers in the social and physical sciences and in engineering whose research can throw light on questions about the wider context of medical research, including public perception and the challenges of cross-disciplinary work.

Natasha Burns is a Research Associate and PhD Student within the Innovation In Society Unit at the University of Central Lancashire (UCLAN). Natasha graduated from UCLAN in 2008 with a LLB Law degree and immediately began her PhD studies entitled: "Theorising New Concepts to Regulate Induced Pluripotent Stem Cells" due for completion in 2012.

Natasha began her research career in 2008 as a Harris Fund intern for the Pharmacy Practice Team (UCLAN) which explored issues of professionalism within pharmacy practice. Natasha then joined the Innovation in Society team as a research assistant to various projects. She has recently been promoted to research associate managing and supporting a number of research projects including GLEUBE. Natasha is also project manager and lead researcher on the European project Alcopop TV Culture. Natasha holds a wide range of research interests including reproductive technologies, embryology, converging technologies, youth engagement, disability access rights, criminal justice, public engagement and policy, ethics, law and governance.

Anthony **Mark Cutter** is Head of the Innovation in Society Unit at the Lancashire Law School, University of Central Lancashire. In addition he has strategic leadership responsibility within the Lancashire Law School for Knowledge Transfer, Income Generation and Nuclear Strategy. With academic qualifications in law, politics and bioethics and professional qualifications as a Barrister, Mediator and Artbitrator his research and practice interests are diverse. As a result he has written, lectured and consulted internationally on a range of topics including (but not limited to): The Governance of Technologies (including nanotechnology, genomics, pharmaceutics, etc); Healthcare in the 21st Century; Equality and diversity (with a special focus on disability); Criminal Justice in the 21st Century (with a special focus on hate crime and surveillance); Digital Media and Public Engagement, and Disability and E-Accessibility. Cutter is an Associate of the ESRC Centre for Economic and Social Aspects of Genomics and Editor-in-Chief of *Studies in Ethics, Law and Technology* (a peer-reviewed journal published by Berkeley Electronic Press) and *The International Library of Ethics, Law and Technology* (Published by Springer). He conducts research and consultancy for a number of public bodies, international organizations and various corporate and SME clients, and currently coordinates a number of large scale projects funded at the European level including: Globalising European Bioethics Education (GLEUBE).

Robert Geyer is Professor of Politics, Complexity and Policy at Lancaster University. His research interests include European Union politics and policy, Social and health policy, International Political Economy, Complexity, politics and public policy, and Scandinavian politics and policy. Geyer has been a Rapporteur on the High Level Scientific Panel for the EU Framework 6, New and Emerging Science and Technologies (NEST) programme, and a Project Proposal Reviewer for the Engineering and Physical Sciences Research Council (EPSRC), Economic and Social Research Council (ESRC), Arts and Humanities Research Council (AHRC) and the NEST programme. Geyer founded and was the Director (2002-2007) of the Centre for Complexity Research (CCR, later ComplexNetwork). While acting as Director, the CCR had over 800 members from 44 different countries and virtually every academic discipline, and it supported a wide variety of research projects and proposals. The activities of the CCR were recognised by the AHRB, ESRC, EPSRC, Wellcome Trust, Royal Society for Chemistry and were profiled in the *Times Higher Education Supplement*. Geyer has received research funding from the British Academy, European Science Foundation, ESRC, ESRC/NEXUS programme, EPSRC, Lancaster University, University of Liverpool, Marquette University, Nuffield Foundation, Scandinavian American Foundation and Social Science Research Council.

Dr **Kristrún Gunnarsdóttir** became a Cesagen Research Fellow at Lancaster University after being awarded a PhD degree from Cardiff University. Her research has been focused on two FP7-funded projects, ICTethics and Technolife, both of which deal with social, ethical and policy implications of new and emerging ICTs. Prior to that, she worked for over a decade as a conceptual/visual designer and ICT professional. She developed interfaces for a range of applications, and worked in the development of digital libraries and in operations management of information exchange systems (e.g. at Cornell University Library, NY, USA and the National and University Library of Iceland).

Kristrún's ICT-related research interests are focused on two distinct topics: 1) Socio-technical analysis and assessment of ICT innovations and visionary work, public engagement, policy programmes and governance, and 2) Human-device interdependence in situated practice and problem-solving, in particular how anomalies and other *phenomena of disorder* can manifest issues of social and ethical relevance (including issues of responsibility, competence, accountability and legitimacy), and how they are recognised and managed on an ongoing basis.

Catherine Luckin has been Policy Officer at the Academy of Medical Sciences since 2009. The Academy promotes advances in medical science and campaigns to ensure these are translated into healthcare benefits for society. The Academy's policy work addresses issues of medical science and healthcare in their wide scientific and societal context. Catherine's work currently involves monitoring developments around the health and public health reforms and leading the secretariat of a joint National Academies project on human enhancement. She previously worked in Public Affairs at Pfizer. Catherine graduated has a degree in Natural Sciences from the University of Bath and went on to study an MSc in Science Communication at Imperial College London.

Dr **Carsten Mehring** is a Senior Lecturer in the departments of Bioengineering and Electrical and Electronic Engineering at Imperial College London. He obtained a Diploma degree in physics from Ruprecht-Karls University of Heidelberg (Germany) and a Dr. rer. nat. (PhD) in biology from Albert-Ludwigs University of Freiburg (Germany). Subsequently he was appointed as a "wissenschaftlicher Assistent" (similar to Assistant Professor) at the Institute of Biology I and the Bernstein Centre Freiburg at the Albert-Ludwigs University before he became a member of academic staff at Imperial College in 2010.

Carsten's research focuses on brain-machine interfaces, i.e. devices that allow subjects to control external actuators solely by their brain activity, and on understanding the computational and neuronal mechanisms underlying motor control and learning in humans.

Professor **Rolando Meloni** (MD) investigated the effects of new experimental drugs on the alcohol consumption and withdrawal syndrome in the rat, during his medical studies at the Institute of Neuroscience, University of Cagliari, Italy. Then, as research assistant professor in the Dept of Pharmacology at the Georgetown University Medical School (Washington DC, USA), he investigated the restorative effects of intra-cerebral dopaminergic embryonic cells on the behavior in a rat model of Parkinson's disease. Thereafter, his interest in human behavior in normal and pathological conditions prompted him to orient his research on the domain of psychiatric genetics.

After a period at the Centre d'Etude du Polymorphisme Humain (Paris, France) and at the Imperial Cancer Research Fund (London, UK), he joined his present laboratory at the Institut du Cerveau et de la Moelle épinière (ICM), Hôpital Pitié-Salpêtrière, where he has established a program for the identification of genes predisposing to bipolar disorder and schizophrenia. In this endeavor, R. Meloni has developed genetic studies by positional cloning and association analysis, but also functional and epigenetic studies. These investigations have allowed to identify several loci and/or genes associated with psychiatric diseases and to show the role of polymorphic disease-associated risk sequences in gene regulation. His current research aims to further validating these discoveries in order to identify new therapeutic targets for psychiatric diseases. In this perspective, he is developing new animal models based on lentiviral-mediated gene transfer in the brain and characterizing these models using system biology approaches (transcriptomics, regulomics, epigenomics).

Dr **Nikki Osborne** is currently a Senior Scientific Officer working in the Research Animals Department of the RSPCA. Having gained both my undergraduate degree and PhD at Kings College London she spent some time as a Post-Doctoral researcher before joining the RSPCA as their Biotechnology specialist in 2005. Since then her work has focused on implementation of the 3Rs (replace, reduce, refine) and promoting contemporary best practice with respect to the use of GA animals in research and testing. Osborne is convenor of three specialist working groups and advise the Society on all biotech issues including the application of biotechnology to livestock animals. This has recently involved the revision of the European Novel Foods legislation as well as the European directive relating to the use of animals in scientific procedures and its implementation within the UK. I am a lay member on several different ERPs within the UK and also provide ethical review input to EU framework programme proposals. I represent Eurogroup for Animals on

biotechnology issues within the EU and have a personal interest in the publication policies of journals publishing research involving the use of animals.

Alun Rhydderch has worked for the UK Government's Foresight Horizon Scanning Centre since its creation in 2005. He has managed a series of futures projects for the Centre, including the International Futures Project (2020 scenarios), the Future of UK Trade with Asia, World Trade: Possible Futures, and Technology and Innovation Futures. He designed and facilitated scenario workshops to inform the UK National Security Strategy. He also designed and commissioned the Sigma Scan, a collection of 250 future issues and trends relevant to UK public policy (www.sigmascan.org). He is a regular speaker on horizon scanning and scenario planning, and a registered trainer at the European Commission, where he has taught a course on the subject. He has published guidance on the use of scenario planning in government.

Tony Webb graduated from Bristol University's School of Veterinary Science in 1978. After qualifying he worked for 7 years in companion animal practice (domestic pets and horses) before returning to academia to pursue interests in veterinary diagnostic imaging and soft tissue surgery at the Universities of Bristol and Liverpool. In 1986 he was appointed Head of the Surgical Research Unit at Pfizer Central Research in Sandwich, Kent with responsibility for a wide range of experimental surgical procedures in laboratory animals. Much of this work involved implantable physiological sensors and other techniques supporting studies on efficacy and safety of potential new medicines. After leaving Pfizer early in 2007, Tony founded a consultancy business (Chiron Bioscience Limited) through which he provides experimental surgical services, advice and training for the private sector (pharmaceutical, biotechnology and contract research organisations), academia and government. A significant proportion of this work deals with implanted telemetric devices which generate physiological data used in Safety Pharmacology studies.

ICT that makes the difference

ICTETHICS

an integrated approach
to addressing the ESLA dynamics of ICT

AN URGENT NEED FOR ESLA OF ICT

There is an urgent need for:

- a systematic analysis of ESLA dynamics in ICT Research & Development
  of the same type as developed by the ESLA (Ethical, Social, and Legal Aspects) working group on biotechnology, established by the European Commission in the early 1990s.
- the structural embedding of ESLA dynamics in ICT Research & Development
  just like this was gradually organised for the life sciences, including biological and medical research, clinical practice and biotechnology, at the end of last century.

Pioneers, including engineers, lawyers, and social scientist, are already involved in ESLA reflection and debate about ICT,
just like doctors, lawyers and ethicists were already adressing ESLA issues before the institutional bioethics movement started.

There is an urgent need to overcome
- the fragmented nature of ESLA-analysis in ICT
- the lack of structural links between the different stakeholders and analysts involved, including ICT research, engineering, industry, public policy, humanities, social sciences, and the public at large.

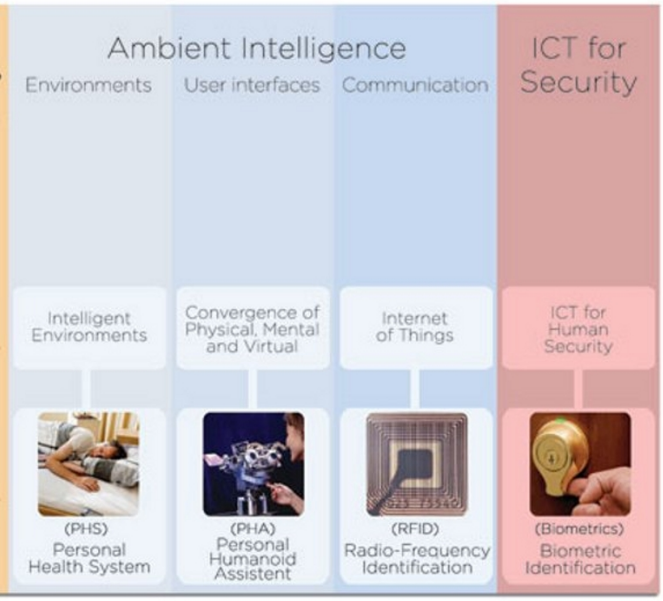
ICT THAT MAKES THE DIFFERENCE

The ICTethics project will develop:

- an integrated conceptual approach to addressing the ESLA dynamics of ICT
- capacity building: networks and collaborative initiatives
- tools, textbooks and courses for students, developers, analysts and users of ICT...

The basis of the work is an investigation of the ESLA dynamics of Ambient Intelligence & ICT for Security, including
- analysis of strategic vision texts, ongoing R&D, ethical and socio-economic literature, law, regulation, policy issues as diverse as data protection, privacy, economic growth, fair acces and e-Inclusion...
- interaction with the actors involved
- feedback to the actors.

The work focusses on
- four strategic ICT developments,
  each of which has the potential to revolutionise private, social, and public life over the next 5 years.
- four flagship developments,
  each of which is characterised by a high market potential and linked to a variety of ethical, social and legal issues.



BUILDING CAPACITY

You can link up to the research, workshops, conferences, publications and other activities of the network.
The initiative is open to relevant projects, academic centres, industrial strategic thinking, stakeholder initiatives...

ICTethics project leaders:
Guido Van Steendam, The IFB, Leuven, Belgium.
Ruth Chadwick, University of Lancaster, UK.
Juliet Lodge, University of Leeds, UK.
Stefano Rodotà, Fondazione Basso, Rome, Italy.

www.ICTethics.eu - www.ICTthatmakesthedifference.eu

European Commission - Directorate General Research
Directorate Science, Economy and Society
Science in Society

Network Secretariat: Prof. dr. Guido Van Steendam, The IFB, Craenendonck 15, 3000 Leuven, Belgium, guido.vansteendam@theIFB.eu

GLEUBE
Globalising European Bioethics Education

Education and Culture DG
ERASMUS MUNDUS

GLEUBE (Globalising European Bioethics Education) is a European Union funded project, aimed at increasing the international profile of European bioethics. The project is collaboration between five European institutions, The University of Central Lancashire (Co-ordinating institution), Cardiff University, Dublin City University, University of Helsinki and the University of Oslo.

Developments in biology, medicine and the life sciences have huge ethical, legal and social implications, yet there is a real deficit of knowledge in the majority of the world's education systems regarding the likely consequences of the ensuing biotechnological revolution. As we enter into the era of **converging technologies**, these problems and risks associated with scientific advancement are heightened. Since the 1970's, the "Georgetown Principles" of autonomy, non-malificence, beneficence and justice have been particularly influential. They form the basis of a majority of bioethics training, especially in medical education, many of which I'm sure you have all experienced.

As a result, these principles dominate standard ethical codes, legal documents and other governance frameworks that regulate medical practice and/or life science research. In the opinion of the GLEUBE research team, the dominance of this approach effectively reduces bioethics to "a checklist" rather than encouraging the analyses of problems and the testing of arguments. In our mind, such principles provide the beginning but not the end of bioethics. Such approaches are obviously popular in the clinical setting, and it is interesting that, despite the growing number of trained bioethicists, the majority of day-to-day medical ethics decisions are made by clinicians without any formal bioethics training. The same individuals are often called upon to teach or train others.

Within the academic study of bioethics some scholars have identified the recent emergence of distinct "European" and "American" principles of bioethics. The so-called American values, are represented by the Georgetown Principles, mention above. In contrast, European Principles might be seen to include autonomy, dignity, integrity and vulnerability. In addition, several 'new' principles have also proved popular in (predominantly European) bioethical debates, especially as relates to genomic technology; these include solidarity, benefit sharing and precaution. Most recently scholars have begun to identify principles that might reconcile or go beyond this apparent disparity of European and American principles. Against this backdrop, some have sought to identify similarities between the European and American principles, whilst others have questioned whether "bioethics" need be a "principles based" discipline at all.

In response to this emergence of distinct European approaches to bioethics, and the perception that current education, clinical and policy activity is dominated by American approaches, GLEUBE proposes to create a resource that showcases European bioethics, scholastic and educative activity to a broad, international, audience.

One of the outcomes of the project is to establish an interactive website where professional bioethicists and bioethics bodies can upload articles and research resources as well as publishing information about recent news, events and courses that are occurring within the world of bioethics in Europe. This information is available to all users both academics and non-academics as well as providing a useful resource for those outside the European union who wish to become involved in bioethics and want to study bioethics in Europe.