Appendix A

Who is working in neuroethics? Where are they?

In a preliminary overview of the field, it was noticed that ‘neuroethicists are not saying enough about the problem of dual-use’,¹ a conclusion promptly validated by Peter B. Reiner, Professor in the National Core for Neuroethics, who wrote:

The truth is that other than Jonathan Moreno, few neuroethicists have applied serious scholarship to the issue of dual use. Of course, it is a simple matter to just say no: neuroscience should only be used for improving the quality of human life. But frankly, that is too simplistic.²

This appendix provides the reader with an overview of where neuroethics is carried out, who is working in the field and what neuroethicists say about dual use. Only some of the main institutions and networks as well as leading neuroethicists are mentioned as representatives of the wider field.

Where

Center for Neuroscience & Society, University of Pennsylvania

The stated mission of the centre is to increase understanding of the impact of neuroscience on society through research and teaching, and to encourage the responsible use of neuroscience for the benefit of humanity. <http://neuroethics.upenn.edu/>

Center for Cognitive Neuroscience, University of Pennsylvania

Penn’s Center for Cognitive Neuroscience is a multidisciplinary community dedicated to understanding the neural bases of human thought. Their current research addresses the central problems of cognitive neuroscience, including perception, attention, learning, memory, language, decision-making, emotion and development. Methods include functional neuroimaging, behavioural testing of neurological and psychiatric patients, transcranial and direct-current

¹ Dando, M. 2010, ‘Neuroethicists are not saying enough about the problem of dual-use’, Bulletin of the Atomic Scientists.
magnetic stimulation, scalp-recorded event-related potentials, intracranial recording, computational modelling, candidate gene studies and pharmacologic manipulations of cognitive processes. <http://ccn.upenn.edu/>

Sage Centre for the Study of the Mind, University of Santa Barbara, California

The Sage Center for the Study of the Mind at the University of California, Santa Barbara, is designed to be a catalyst for interdisciplinary study of the relationship of brain and mind. The centre integrates a wide range of scholarly endeavours and technologies in the humanities, social sciences and the sciences. <www.sagecenter.ucsb.edu/intro.htm>

Dana Foundation

The Dana Foundation is a private philanthropic organisation that supports brain research through grants and educates the public about the successes and potential of brain research. Dana produces free publications; coordinates the International Brain Awareness Week campaign; supports the Dana Alliances, a network of neuroscientists; and maintains a web site: <www.dana.org>. The Dana Foundation’s science and health grants support clinical research in neuroscience and neuro-immunology and their interrelationship in human health and disease.

European Neuroscience and Society Network

The European Neuroscience and Society Network (ENSN) is the leading European network for interdisciplinary discussions of the social implications of the neurosciences. Funded by the European Science Foundation and convened by researchers at the BIOS Centre, London School of Economics, the ENSN has been established to serve as a multidisciplinary forum for timely engagement with the social, political and economic implications of developments in the neurosciences, a field that has experienced unprecedented advances in the past 20 years. <www.neurosocieties.eu/>

Neuroethics Society

The Neuroethics Society is an interdisciplinary group of scholars, scientists, clinicians and other professionals who share an interest in the social, legal, ethical and policy implications of advances in neuroscience. Their stated mission is to promote the development and responsible application of neuroscience through interdisciplinary and international research, education, outreach and public engagement for the benefit of people of all nations, ethnicities and cultures. <www.neuroethicssociety.org>
National Core for Neuroethics, University of British Columbia, Vancouver, Canada

The National Core for Neuroethics hosted by the University of British Columbia is an interdisciplinary research group dedicated to tackling the ethical, legal, policy and social implications of frontier technological developments in the neurosciences. The objective is to align innovations in the brain sciences with societal, cultural and individual human values through high-impact research, education and outreach. <www.neuroethics.ubc.ca>

Brain Research Centre, University of British Columbia, Vancouver, Canada

The Brain Research Centre, located in Vancouver, Canada, is a unique partnership between the Vancouver Coastal Health Research Institute and the Faculty of Medicine at the University of British Columbia. The hospital has combined forces with broad, multidisciplinary research expertise at the University of British Columbia to advance knowledge of the brain and to explore new discoveries and technologies that have the potential to reduce the suffering and cost associated with disease and injuries of the brain. <www.brain.ubc.ca/>

The Oxford Centre for Neuroethics, University of Oxford

Established in January 2009, the Oxford Centre for Neuroethics aims to address concerns about the effects neuroscience and neurotechnologies will have on various aspects of human life. Its research focuses on five key areas: cognitive enhancement; borderline consciousness and severe neurological impairment; free will, responsibility and addiction; the neuroscience of morality and decision-making; and applied neuroethics. It is the first international centre in the United Kingdom dedicated to neuroethical research. It is founded by the Wellcome Trust’s Biomedical Ethics Strategic Awards Program. <www.neuroethics.ox.ac.uk>

National Institute of Neuroscience, Italy

The Institute of Neuroscience of the National Research Council considers itself to be one of the top institutions in the field of neuroscience in Europe. It concentrates many of the most important Italian scientists involved in the study of the nervous system, who are organised in research groups, located in Milan, Padua, Pisa, Rome and Cagliari. The Institute of Neuroscience of the National Research Council addresses all the principal topics in the study of the nervous system, investigating the development and plasticity of the nervous circuitry; vision and cognitive sciences; the mechanisms of memory and learning; as well as those involving cellular transmission and neuronal communication;
neuromuscular and neuronal-glial interactions, and the neurobiological bases of alcoholism and drug dependence. <www.cnr.it/istituti/Descrizione_eng.html?cds=061>

**Neuroscience Centre, Dartmouth (NCD)**

The establishment of the Neuroscience Center at Dartmouth (NCD) in 2002 produced a new and unique interdisciplinary group whose mission is to foster collaborative and interactive research and education in the neurosciences. The NCD draws from its strengths in three key areas: clinical; cognitive and behavioural; and molecular/cellular/systems neuroscience. It is the vision of its researchers to produce and disseminate new knowledge, and in doing so train and educate the next generation of neuroscientists. Interactions among members of the neuroscience community are enhanced and foster a highly interactive atmosphere through the development of this integrated centre. By promoting multidisciplinary efforts in both basic and applied research, the centre’s scientists will contribute to human health and wellbeing by increasing our understanding of the mechanisms underlying nervous system function, both in health and in disease. This will lead to valuable discoveries that translate into novel pharmaceutical agents and therapeutic approaches for the treatment of a variety of central nervous system diseases and disorders. <http://dms.dartmouth.edu/>

**International Neuroethics Network**

The International Neuroethics Network (INN) was launched in 2005 at the Society for Neuroscience Annual Meeting in Washington, DC. The network’s vision is to foster international collaboration in neuroethics through the identification of common priorities and joint funding opportunities. The INN’s objective is to serve as a means of communication and support among neuroethicists all around the world. <www.neuroethics.ubc.ca>

**Stanford Program for Neuroethics, Stanford University**

The Stanford Program for Neuroethics is a research team devoted to the new field of neuroethics, with an initial focus on issues at the intersection of medical imaging and biomedical ethics. These include ethical, social and legal challenges presented by advanced neurofunctional imaging capabilities, the emergence of cognitive enhancement neurotechnologies and pharmacology, self-referral to healthcare and imaging services, incidental findings, and fetal MRI. New initiatives are under way in regenerative medicine, neurogenetics and pediatric neuroethics. Several program members are also involved in the John D. and Catherine T. MacArthur Foundation’s Law and Neuroscience Project, including Hank Greely, Emily Murphy and Teneille Brown. The project seeks to address
issues that neuroscience raises for our legal system through its three Research
Networks—Diminished Brains, Addiction and Decision Making—and its
Education and Outreach Program. <http://neuroethics.stanford.edu>

MacArthur Law & Neuroscience Project

The MacArthur Law and Neuroscience Project investigates the impact of modern
neuroscience on criminal law and in particular the diverse and complex issues
that neuroscience raises for the criminal justice system in the United States.
<www.lawneuro.org>

The Neuroethics Research Unit

The Neuroethics Research Unit is committed to training a new generation of
students in neuroethics through the conduct of collaborative interdisciplinary
research. Research interests include the ethical application of neuroscience
in research and patient care, empirical bioethics research, and pragmatism in
bioethics. It is based at the Montreal Institute of Clinical Research. <http://
www.ircm.qc.ca/microsites/neuroethics/en/index.html>

Novel Tech Ethics

The team at Novel Tech Ethics is committed to public discussion of the ethics
issues that affect all human beings. Key focal points of the Novel Tech Ethics
Research Team include

• how are psychopharmacologies creating a ‘new normal’ for human
  behaviour—and what is normal for humans when ‘regenerative medicine’
mixes and matches cells across species
• how will the results emerging from neuroimaging studies and behavioural
  genetics affect our understanding—and social and legal enactment—of free
  will and responsibility
• what are the particular kinds of ‘harm’ and ‘benefit’ offered by neurological
  treatment, neurological enhancement and neurological control, and how do
  these challenge traditional notions and practices of risk assessment?
<www.noveltechethics.ca/site_events.php>

University of Wisconsin: Neuroscience and Public Policy Program

The program emerged from the recognition that the rapid advancement in
neuroscience demanded research neuroscientists to be trained to think critically
about both neuroscience and the making of public policy, and to have appropriate
skills, experience and networks to facilitate an effective integration of the two.
The program is hosted by the University of Wisconsin–Madison. A central
element of the program is the weekly Neuroscience and Public Policy Seminar, which challenges students to synthesise information across neuroscience and policy research. <http://npp.neuroscience.wisc.edu/index.html>

**The Neuroethics New Emerging Team (NET)**

The Neuroethics New Emerging Team (NET) is based at Dalhousie University, Canada. Launched in 2003, the NET aims to undertake an interdisciplinary study of, and disseminate their findings on, the ethical issues posed by advances in neuroscience technology. It is funded by the Canadian Institutes of Health Research. <http://www.neuroethics.ca/Neuroethics.ca>

**Who**

**Colin Blakemore**

Colin Blakemore is a neurobiologist at Oxford University. He is specialised in vision and development of the brain. He also holds professorships at the University of Warwick and the Duke University—National University of Singapore Graduate Medical School, where he is chairman of Singapore’s Neuroscience Research Partnership. His research has been concerned with many aspects of vision, the early development of the brain and plasticity of the cerebral cortex.

**Turhan Canli**

Turhan Canli is Associate Professor at Stony Brook University. The work in Dr Canli’s laboratory focuses on the hormonal and neurogenetic bases of individual differences in emotion and cognition. The research addresses these questions: what are the biological mechanisms that can explain human personality? What is the mechanism by which life experience, in interaction with genetic variation, influences brain function to generate behavioural patterns that we associate with certain personality traits? Do men and women differ in how their brains respond to these genetic and experiential influences? Can this information be used to identify healthy individuals at risk for psychopathology? To address these questions, Dr Canli’s team uses a number of different technologies: functional magnetic resonance imaging (fMRI); transcranial magnetic stimulation (TMS); molecular genetics; and hormone assays.
Arthur Caplan

Arthur Caplan is Emanuel and Robert Hart Professor of Bioethics and Philosophy at the University of Pennsylvania. His research interests focus on transplantation research ethics, genetics, reproductive technologies, health policy and general bioethics.

Jocelyn Downie

Jocelyn Downie is Professor at Faculties of Law and Medicine, Dalhousie University. She works at the intersection of law, ethics and health care. Her research interests include women’s health, assisted death, research involving humans, and organ transplantation. Her work is interdisciplinary, collaborative and geared both to contributing to the academic literature and to affecting change in health law and policy at federal and provincial levels.

Martha J. Farah

Martha J. Farah is a cognitive neuroscientist at the University of Pennsylvania, who works on problems at the interface of neuroscience and society, including

• the effects of childhood poverty on brain development
• the expanding use of neuropsychiatric medications by healthy people for brain enhancement
• novel uses of brain imaging in, for example, legal, diagnostic and educational contexts
• the many ways in which neuroscience is changing the way we think of ourselves as physical, mental, moral and spiritual beings.

Kenneth R. Foster

Kenneth R. Foster is a professor of bioengineering. His research interests relate to biomedical applications of non-ionising radiation from audio through to microwave frequency ranges, and health and safety aspects of electromagnetic fields as they interact with the body. For example, he examines the prospects of workers in electrical occupations and the possibility (or lack of) cancer risk. Another and somewhat broader topic of interest is technological risk and the impact of technology (principally, electro-technologies) on humans. His goal in this area is to examine technology, putting into perspective its relative risks and benefits to society. What he hopes to impart is a better perception of the social use of science.
Michael Gazzaniga

Michael Gazzaniga is a professor of psychology and the Director of the Sage Center for the Study of the Mind at the University of California, Santa Barbara. He oversees an extensive and broad research program investigating how the brain enables the mind. Over the course of several decades, a major focus of his research has been an extensive study of patients who have undergone split-brain surgery that has revealed lateralisation of functions across the cerebral hemispheres.

Henry Greely

Henry Greely is Deane F. and Kate Edelman Johnson Professor of Law. A leading expert on the legal, ethical and social issues surrounding health law and the biosciences, Hank specialises in the implications of new biomedical technologies, especially those related to neuroscience, genetics and stem-cell research. He frequently serves as an advisor on Californian, national and international policy issues. He is chair of California’s Human Stem Cell Research Advisory Committee and served from 2007 to 2010 as co-director of the Law and Neuroscience Project, funded by the MacArthur Foundation. Active in university leadership, Professor Greely chairs the steering committee for the Stanford Center for Biomedical Ethics and directs both the law school’s Center for Law and the Biosciences and the Stanford Interdisciplinary Group on Neuroscience and Society. Professor Greely serves on the Scientific Leadership Council for the university’s interdisciplinary Bio-X Program.

Ronald M. Green

Ronald M. Green is Eunice and Julian Cohen Professor for the Study of Ethics and Human Values. Ronald M. Green has been a member of Dartmouth University’s Religion Department since 1969; he also directs Dartmouth’s Ethics Institute, a consortium of faculty concerned with teaching and research in applied and professional ethics. Professor Green’s research interests are in genetic ethics, biomedical ethics and issues of justice in healthcare allocation. He is the author of six books and more than 130 articles in theoretical and applied ethics.

Judy Illes

Judy Illes is Associate Professor of Pediatrics (Medical Genetics) and Director of the Program in Neuroethics at the Stanford Center for Biomedical Ethics. She also co-founded the Stanford Brain Research Center (now the Neuroscience Institute at Stanford), and served as its first executive director between 1998 and 2001. Today, Dr Illes directs a strong research team devoted to neuroethics, and issues specifically at the intersection of medical imaging and biomedical ethics. These include ethical, social and legal challenges presented by advanced functional
imaging capabilities, the emergence of cognitive enhancement technologies and pharmacology, the commercialisation of cognitive neuroscience, and clinical findings detected incidentally in research.

Jonathan Moreno

Jonathan Moreno is the David and Lyn Silfen University Professor of Ethics and Professor of Medical Ethics and of History and Sociology of Science at Pennsylvania University. He holds a courtesy appointment as Professor of Philosophy. He is also a Senior Fellow at the Center for American Progress in Washington, DC, where he edits the magazine Science Progress. He was a member of President Barack Obama’s transition team for the Department of Health and Human Services. In the course of his career, Professor Moreno has applied serious scholarship to the issue of dual use in neuroscience, revealing that several of the new technologies are ‘potentially applicable to medical therapy or other peaceful purposes as well as combat, riot control, hostage situations, or other security problems’.

Stephen J. Morse

Stephen J. Morse is Professor of Psychology and Law in Psychiatry. Stephen J. Morse is an expert in criminal and mental health law whose work emphasises individual responsibility in criminal and civil law. Morse was co-director of the MacArthur Foundation’s Law and Neuroscience Project and he co-directed the project’s Research Network on Criminal Responsibility and Prediction. Morse is a diplomate in Forensic Psychology of the American Board of Professional Psychology; a past president of Division 41 of the American Psychological Association (the American Psychology–Law Society); a recipient of the American Academy of Forensic Psychology’s Distinguished Contribution Award; a member of the MacArthur Foundation Research Network on Mental Health and Law (1988–96); and a trustee of the Bazelon Center for Mental Health Law in Washington, DC (1995–present).

Peter B. Reiner

Peter B. Reiner is Professor in the National Core for Neuroethics and a member of the Kinsmen Laboratory of Neurological Research, Department of Psychiatry and the Brain Research Centre at the University of British Columbia. Dr Reiner has a distinguished track record as a research scientist studying the neurobiology of behavioural states and the molecular underpinnings of neurodegenerative disease. Dr Reiner also has experience in the private sector, having been president and CEO of Active Pass Pharmaceuticals, a drug discovery company that he founded to tackle the scourge of Alzheimer’s disease. Upon returning to
academic life, Dr Reiner refocused his scholarly work in the area of neuroethics, with interests in neuro-essentialism, the neuroethics of cognitive enhancement and the commercialisation of neuroscience.

Paul R. Wolpe

Paul R. Wolpe is Associate Professor of Psychiatry in the Department of Psychiatry at the University of Pennsylvania, where he also holds appointments in the Department of Medical Ethics and the Department of Sociology. He is President of the American Society for Bioethics and Humanities and is Co-Editor of the American Journal of Bioethics. Dr Wolpe serves as the first Chief of Bioethics for the National Aeronautics and Space Administration (NASA).