TRINITY COLLEGE

INSTITUTE OF NEUROSCIENCE

FROM MOLECULES TO MIND

PRINCIPAL INVESTIGATORS PROFILES

TRINITY COLLEGE DUBLIN

Introduction

The Trinity College Institute of Neuroscience (TCIN) was founded in 2002 with the objective of consolidating the strengths of PIs involved in neuroscience research from disciplines including genetics, biochemistry, psychology, pharmacology, physiology, neurology, gerontology, psychiatry, physics and computer science building a truly interdisciplinary research institute where world-class scientists collaborate to address a major challenge of our time – how to foster and maintain the best functioning of the human brain, particularly as we age. We aim to face this challenge by addressing basic scientific questions using a multidisciplinary approach and by building teams of researchers within specific areas of translational neuroscience.

TCIN occupies 3,300m2 of state-of-the-art facilities in the city centre campus where 17 PIs are based; others are based at our nearby sister hospitals, St James Hospital and AMiNCH. Since its official opening in 2005, TCIN has succeeded in substantially increasing the numbers of PIs, graduate students and post-doctoral fellows.

Neuroscience has been identified as an area of strategic strength in Trinity College Dublin reflecting the quality of existing research programmes, the international reputations of several PIs, the clustering of expertise in specific research areas and the track record of significant funding awards to individuals and interdisciplinary groups.

There are 5 research themes in TCIN, each comprising PIs in basic and clinical sciences, consistent with the objective of supporting Translational Research, a number of these are underpinned by collaborative projects with industrial partners. The 5 research themes are:

Neurodegeneration, neuroprotection and neurorepair
Brain aging
Learning, memory and cognition
Psychiatric diseases and drug abuse
Neural development and plasticity

The PIs associated with these themes are listed below.

Neurodegeneration, neuroprotection and neurorepair

Prof. Marina Lynch
Prof. Kingston Mills
Dr. Gavin Davey
Prof. Michael Rowan
Prof. Roger Anwyl
Dr. Thomas Connor
Dr. Colm Cunningham
Prof. Shane O'Mara
Prof. Veronica Campbell
Prof. Pete Humphries
Dr. Jane Farrar
Dr. Julie Kelly
Prof. Orla Hardiman
Prof. Harald Hampel
Dr. Arun Bokde
Dr. Aileen Lynch
Dr. Aine Kelly
Dr. Gary Donohue
Prof. Kumlesh Dev
Dr. Paul Kenna
Dr. Connail McCrory
Dr. Colin Doherty*
* Affiliates

Brain aging

Prof. Marina Lynch
Dr. Aine Kelly
Prof. Rose-Anne Kenny
Prof. Brian Lawlor
Prof. Michael Rowan
Prof. Desmond O'Neill
Prof. Harald Hampel
Prof. Ian Robertson
Prof. Declan McLoughlin
Dr. Aileen Lynch
Prof. Kumlesh Dev
Prof. Shane O'Mara
Dr. Arun Bokde
Dr. Gary Donohue

Learning, memory and cognition

Prof. Shane O'Mara
Prof. Ruth Byrne
Prof. Hugh Garavan
Prof. Fiona Newell
Prof. Ian Robertson
Prof. Michael Rowan
Prof. Brian Lawlor
Dr. Paul Dockree
Prof. Desmond O'Neill
Prof. John O'Doherty
Prof. Mani Ramaswami
Prof. Kumlesh Dev
Prof. Thomas Frodl
Dr. Conor Houghton
Dr. Aiden Corvin
Dr. Alice Witney
Dr. James Gibney*
Dr. Richard Roche*
Prof. John Foxe*
Dr. Niall Pender*

Psychiatric diseases and drug abuse

Dr. Andrew Harkin
Prof. Shane O'Mara
Dr. Thomas Connor
Prof. Veronica Campbell
Prof. Kumlesh Dev
Prof. Brian Lawlor
Prof. Michael Gill
Prof. Ian Robertson
Prof. Hugh Garavan
Prof. Harald Hampell
Prof. Declan McLoughlin
Prof. Thomas Frodl
Dr. Gary Donohue
Prof. Pat McKeon*
Dr. Jogin Thakore*
Dr. Daniela Tropea
Dr. Aiden Corvin

Neural development and plasticity

Dr. Kevin Mitchell
Prof. Mani Ramaswami
Prof. Roger Anwyl
Prof. Michael Rowan
Prof. Shane O'Mara
Dr. Daniel Ulrich
Dr. J. Pablo Labrador
Prof. Khurshid Ahmad
Prof. Kumlesh Dev
Prof. Jane Farrar
Prof. Pete Humphries
Prof. Thomas Frodl

NEURODEGENERATION, NEUROPROTECTION AND NEUROREPAIR

BRAIN AGING

LEARNING, MEMORY AND COGNITION

PSYCHIATRIC DISEASES AND DRUG ABUSE

NEURAL DEVELOPMENT AND PLASTICITY

Name:	Prof. Roger Anwyl
Position:	Professor of Physiology
Contact details:	Department of Physiology School of Medicine Trinity College Dublin Telephone: 353-01-896-1624 Email: roger.anwyl@tcd.ie

RESEARCH INTERESTS:

My research area is neurophysiology, electrophysiology and neurological disease models. Our group studies the effects of natural and synthetic agents on neurological conditions with a particular focus on Alzheimer's disease. We study long-term potentiation effects and synaptic transmission for various receptor sites, including Glutamate Metabotropic receptors. Our group also examines the effects of pharmacological therapeutic agents and neurotoxins and their effects on synaptic plasticity and neuronal repair.

RECENT PUBLICATIONS:

Ryan, B., Musazzi, L., Mallei, A. ., Anwyl, R et al. (2009) Remodelling by early-life stress of NMDA receptor-dependent synaptic plasticity in a gene-environment rat model of depression. *Int. J. Neuropsychopharmacol.* 12: 553-559.

Ryan, B. K., Anwyl, R. and Rowan, M. J. (2008) 5-HT2 receptor-mediated reversal of the inhibition of hippocampal long-term potentiation by acute inescapable stress. *Neuropharmacology.* 55: 175-182.

Wang, Q., Klyubin, I., Wright, S., Griswold-Prenner, I., Rowan, M. J. and Anwyl, R. (2008a) Alpha v integrins mediate beta-amyloid induced inhibition of long-term potentiation. *Neurobiol. Aging.* 29: 1485-1493.

Welsby, P. J., Rowan, M. J. and Anwyl, R. (2009) Intracellular mechanisms underlying the nicotinic enhancement of LTP in the rat dentate gyrus. *Eur. J. Neurosci*. 29: 65-75.

Wu, J., Harney, S., Rowan, M. J. and Anwyl, R. (2008) Involvement of group I mGluRs in LTP induced by strong high frequency stimulation in the dentate gyrus in vitro. *Neurosci. Lett.* 436: 235-238.

RESEARCH FUNDING:

Science Foundation Ireland, Wellcome Trust and European Union

Name:	Dr. Arun Bokde
Position:	SFI Stokes Lecturer in Neuroimaging
Contact details:	Department of Psychiatry School of Medicine Trinity College Dublin Telephone: 353-01-896-4104 Email: Arun.Bokde@tcd.ie

RESEARCH INTERESTS:

My research area is in neuroimaging and Alzheimer's disease. I am interested in the early functional changes in the brain due to neurodegeneration and have investigated the changes in the visual and memory cognitive domains. I have investigated how brain networks are altered by brain neuropathology with the objective of developing neuroimaging based markers of Alzheimer's disease. I have also been active in the use of machine learning methods for functional neuroimaging data to detect and discriminate between cognitive states. An area of active interest is the investigation of function-structure interaction using functional MRI, structural MRI, and diffusion tensor imaging.

RECENT PUBLICATIONS:

Bokde ALW, Lopez-Bayo P, Born C, Dong W, Meindl T, Leinsinger G, Teipel SJ, Faltraco F, Reiser MF, Möller H-J and Hampel H (2008). Functional abnormalities of the visual processing system in subjects with mild cognitive imapirment: an fMRI study. *Psychiatry Res.* 163: 248-259.

Hampel H, Bürger K, Teipel SJ, Bokde AL, Zetterberg H and Blennow K. (2008). Core candidate neurochemical and imaging biomarkers of Alzheimer's disease. *Alzheimers Dement.* 4: 38-48.

Teipel SJ, Born C, Ewers M, Bokde ALW, Reiser MF, Möller H-J and Hampel H (2007). Multivariate deformation-based analysis of brain atrophy to predict Alzheimer's disease in mild cognitive impairment. *Neuroimage* 38: 13-24.

Teipel SJ, Bokde ALW, Born C, Meindl T, Reiser MF, Möller H-J and Hampel H (2007). Morphological substrate of face matching in healthy ageing and mild cognitive impairment: a combined MRI-fMRI study. *Brain* 130: 1745-1758.

Teipel SJ, Stahl R, Dietrich O, Schoenberg SO, Perneczky R, Bokde ALW, Reiser MF, Möller H-J and Hampel H (2007). Multivariate network analysis of fiber tract integrity in Alzheimer's disease. *Neuroimage* 34: 985-995.

Bokde ALW, Lopez-Bayo P, Meindl T, Pechler S, Born C, Faltraco F, Teipel SJ, Möller H-J and Hampel H (2006). Functional connectivity of the fusiform gyrus during a face-matching task in subjects with mild cognitive impairment. *Brain* 129: 1113-1124.

RESEARCH FUNDING:

Science Foundation Ireland

Name: Prof. Ruth Byrne

Position: Professsor of Cognitive Science

Contact details: School of Psychology,
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RESEARCH INTERESTS:

The human imagination remains one of the last uncharted terrains of the mind and a central aspect of the imagination is the creation of counterfactual alternatives to reality. My work examines the mental representations and cognitive processes that underlie deductive reasoning and counterfactual imagination, to test the theory that imaginative thoughts are guided by the same principles that underlie rational thoughts. Methods include behavioral studies using experimental measures, computational simulations, and fMRI studies. The research is carried out in collaboration with colleagues in Princeton University, IUAV Venice, and La Laguna University, Tenerife.

RECENT PUBLICATIONS:

Byrne RMJ and Johnson-Laird PN (2009). 'If' and the problems of conditionals. *Trends Cogn. Sci.* (In press).

Espino O, Santamaria C and Byrne RMJ. (2009). People think about what is true for conditionals, not what is false. *Q. J. Exp. Psychol.* 20: 1-7

Moreno-Rios S, Garcia-Madruga J and Byrne RMJ (2008). Semifactual 'even if' reasoning. *Acta Psychologica* 128: 197 – 209

Byrne RMJ (2007). Précis of the Rational Imagination: How people create alternatives to reality. *Behav. Brain Sci.* 30: 439 – 453

Byrne RMJ (2007). The rational imagination and other possibilities: Author's response. *Behav. Brain Sci.* 30: 470 – 480

Walsh CR and Byrne RMJ (2007). Reasons and actions in counterfactual thinking. *Thinking and Reasoning.* 13: 461- 483

McEleney A and Byrne RMJ (2006). Spontaneous causal and counterfactual thoughts. *Thinking and Reasoning.* 12: 235-255.

Byrne RMJ (2005). The Rational Imagination: How people create alternatives to reality. *Cambridge, M.A*: MIT Press.

RESEARCH FUNDING:

Irish Research Council for the Humanities and Social Sciences, Irish Research Council for Science, Engineering and Technology, Enterprise Ireland.

Name: Prof. Veronica Campbell

Position: Associate Professsor in Physiology

Contact details: Department of Physiology
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RESEARCH INTERESTS:

My research area is in cellular neuroscience and neuropharmacology. I am interested in the cell and molecular mechanisms that mediate neurotoxicity evoked by ß-amyloid, the principal component of the senile plaque in Alzheimer's disease. Other projects are concerned with the influence of the cannabinoid system on (i) neural fate and (ii) adult stem cell differentation. To address these research questions I employ a number of in vitro approaches including primary neuronal culture, siRNA technology, confocal laser scanning microscopy and a range of biochemical & molecular techniques. My research group comprises 1 post-doctoral researcher and 4 postgraduate students.

RECENT PUBLICATIONS:

Fogarty MP, McCormack RM, Noonan J, Murphy D, Gowran A and Campbell VA. (2009) A role for p53 in the beta-amyloid-mediated regulation of the lysosomal system. *Neurobiol Aging*. [Epub ahead of print].

Gowran A and Campbell VA (2008). A role for p53 in the regulation of lysosomal permeability by Delta(9)-tetrahydrocannabinol in rat cortical neurones; implications for neurodegeneration. *J. Neurochem*. 105: 1513-1524.

Downer EJ, Gowran A and Campbell VA (2007). A comparison of the apoptotic effect of Δ^9-tetrahydrocannabinol in the neonatal and adult rat cerebral cortex. *Brain Res*.1175: 39-47.

Campbell V and Gowran A (2007). Alzheimer's disease' taking the edge off with cannabinoids? *Br. J. Pharmacol*. 152: 655-662.

Downer EJ, Gowran A, Murphy AC and Campbell VA (2007). The tumour suppressor protein, p53, is involved in the activation of the apoptotic cascade by Δ^9-tetrahydrocannabinol in cultured cortical neurons. *Eur. J. Pharmacol*. 564: 57-65

Boland B and Campbell V (2004). Aß-mediated activation of the apoptotic cascade in cultured cortical neurones: a role for cathepsin-L. Neurobiol. Aging 25: 83-91.

RESEARCH FUNDING:

Science Foundation Ireland, Enterprise Ireland, Health Research Board

Name: Prof. Thomas Connor

Position: Associate Professor in Neuroscience

Contact details: Department of Physiology,
Trinity College Dublin
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E-mail: connort@tcd.ie

RESEARCH INTERESTS:

My research is focused on nervous system-immune system interactions, and can be divided into two interrelated themes:

1. The role of inflammation in precipitating depression and neurodegeneration, and the therapeutic utility of anti-inflammatory agents in treating depression and neurodegeneration.

2. The immunomodulatory effects of psychological stress, and the ability of antidepressants and anxiolytics to ameliorate stress-induced immunological dysfunction.

RECENT PUBLICATIONS:

O'Sullivan JB, Ryan KM, Curtin NM, Harkin A and Connor TJ. (2009). Noradrenaline reuptake inhibitors limit neuroinflammation in rat cortex following a systemic inflammatory challenge: implications for depression and neurodegeneration. *Int. J. Neuropsychopharmacol*. 12: 687-699.

Curtin NM, Boyle NT, Mills KH, Connor TJ (2009). Psychological stress suppresses innate IFN-γ production via glucocorticoid receptor activation: Reversal by the anxiolytic chlordiazepoxide. *Brain Behav. Immun.* 23: 535-547.

Curtin NM, Mills KH, Connor TJ. (2009). Psychological stress increases expression of IL-10 and its homolog IL-19 via β-adrenoceptor activation: reversal by the anxiolytic chlordiazepoxide. *Brain Behav. Immun*. 23: 371-379.

Connor TJ, Starr N, O'Sullivan JB, Harkin A. (2009). Induction of indolamine 2,3-dioxygenase and kynurenine 3-monooxygenase in rat brain following a systemic inflammatory challenge: a role for IFN-γ? *Neurosci. Lett.* 441: 29-34.

Diamond M, Kelly JP and Connor TJ (2006) Antidepressants suppress production of the Th1 cytokine interferon-γ, independent of monoamine transporter blockade. *Eur. Neuropsychopharmacol*. 16: 481-490.

RESEARCH FUNDING:

Science Foundation Ireland, Irish Research Council for Science, Engineering and Technology, Health Research Board, European Union FP7.

Name:	Prof. Aiden Corvin
Position:	Associate & Consultant in Psychiatry
Contact details:	Department of Psychiatry, Trinity College, Dublin Telephone: 353-01-896-2462 Email: acorvin@tcd.ie

RESEARCH INTERESTS:

The goal of the Psychosis Research Group is to identify and investigate the genetic architecture of schizophrenia (SZ; OMIM 181500) and related disorders. SZ is a complex brain disorder characterized by psychotic symptoms (e.g. delusions and hallucinations), negative symptoms (affecting mood and motivation) and cognitive deficits. This work is important because ~1% of the adult population are affected, representing about 24 million people worldwide. Current therapies are only partially effective. Because SZ is substantial heritability (h2~0.8) and of uncertain aetiology, identifying risk genes will be key to understanding pathophysiological mechanism(s), for molecular subtyping and in developing novel pharmacotherapies.

RECENT PUBLICATIONS:

Wellcome Trust Case Control Consortium. (2008). Collaborative genome-wide association analysis supports a role for ANK3 and CACNA1C in bipolar disorder. *Nat. Genet.* 40: 1056-1058.

Molecular Genetics of Schizophrenia Collaboration. (2009). Analysis of 10 independent samples provides evidence for association between schizophrenia and a SNP flanking fibroblast growth factor receptor 2. *Mol. Psychiatry*. 14: 30-36.

Donohoe G, Morris DW, De Sanctis P, Magno E, Montesi JL, Garavan H, Robertson I, Javitt JC, Gill M, Corvin A and Foxe JJ (2007). Early visual processing deficits in Dysbindin-associated schizophrenia. *Biol. Psychiatry.* 63: 484-489.

Donohoe G, Morris DW, Robertson IH, McGhee K, Murphy K, Kenny N, Clarke S, Gill M and Corvin A (2007). DAOA ARG30LYS and verbal memory function in schizophrenia. *Mol. Psychiatry* 12: 795-796.

Morris DW, Murphy K, Kenny N, Purcell SM, McGhee K, Schwaiger S, Nangle JM, Donohoe G, Clarke S, Scully P, Quinn J, Meagher D, Baldwin P, Crumlish N, O'Callaghan E, Waddington JL, Gill M and Corvin A. (2007). Dysbindin (DTNBP1) and the BLOC-1 protein complex: main and epistatic interactions are potential contributors to schizophrenia susceptibility. *Biol. Psychiatry* 63: 24-31.

Corvin A, Morris DW, McGhee K, Schwaiger S, Scully P, Quinn J, Meagher D, Waddington JL and Gill M. (2004) Confirmation and refinement of an 'at risk' haplotype for schizophrenia suggests the EST cluster, Hs.97362, as a potential susceptibility gene at the Neuregulin-1 locus. *Mol. Psychiatry* 9: 208-213.

RESEARCH FUNDING:

Science Foundation Ireland, Health Research Board, Wellcome Trust

Name:	Dr. Colm Cunningham
Position:	Research Lecturer
Contact details:	School of Biochemistry and Immunology Trinity College, Dublin Telephone: 353-01-896-8528 Email: colm.cunningham@tcd.ie

RESEARCH INTERESTS:

My principal research interests lie at the point of intersection between neurodegeneration, inflammation and behaviour. I am studying the interaction between systemic and central nervous system inflammation. Much of my research in recent years has focused on a mouse model of prion disease. This model has been extremely useful in characterising the atypical inflammatory response to chronic neurodegeneration. CNS responses to peripheral insults are exaggerated during chronic neurodegenerative disease and microglial priming appears to play a key role in this. My laboratory currently uses bacterial lipopolysaccharide (LPS) and synthetic double stranded RNA (polyI:C) to study the impact of anti-bacterial and anti-viral acute phase responses on CNS function in physiological and pathological situations. This interaction between peripheral and CNS compartments plays a key role in exacerbations of disease such as episodes of delirium in Alzheimer's disease & relapse in Multiple Sclerosis. The development of a model of inflammation-induced delirium is an ongoing initiative.

RECENT PUBLICATIONS:

Cunningham O, Campion S, Murray C, Perry VH, Sidenius N, Docagne F and Cunningham C. (2009). Microglia and the urokinase plasminogen activator receptor (uPAR) / uPA system in innate brain inflammation. *Glia* (In press).

Cunningham C, Campion S, Lunnon K, Deacon RMJ, Rawlins JNP and Perry VH (2009). Systemic inflammation superimposed on chronic neurodegeneration induces acute behavioural and cognitive changes and accelerates neurological decline. *Biol. Psychiatry* 65: 304-312.

Cunningham C and Sanderson DJ. (2008) Malaise in the water maze: Untangling the effects of LPS and IL-1β on learning and memory. *Brain Behav. Immun*. 22: 1117-1127.

Perry VH, Cunningham C and Holmes C (2007). Systemic infections affect chronic neurodegeneration. *Nat. Rev. Immunol*. 7: 161-167.

Cunningham C, Campion S, Teeling J, Felton J and Perry VH (2007). The sickness behaviour and CNS inflammatory mediator profile induced by systemic challenge of mice with synthetic double stranded RNA (Poly I:C). *Brain Behav. Immun.* 21: 490-502.

Cunningham C, Wilcockson DC, Campion S, Lunnon K and Perry VH (2005) Central and systemic endotoxin challenges exacerbate the local inflammatory response and increase neuronal death during chronic neurodegeneration. *J. Neurosci*. 25: 9275-9284.

RESEARCH FUNDING:

The Wellcome Trust

Name: Dr. Gavin Davey

Position: Senior Lecturer in Neuroscience

Contact details: School of Biochemistry & Immunology
Trinity College Dublin
Telephone: 353-01-896-8408
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RESEARCH INTERESTS:

My research focuses on the molecular and cellular mechanisms that underlie neurodegeneration in the brain, in particular, the role that energy metabolism and bioenergetics play in controlling neuronal function and dysfunction. We use a range of in vitro, in vivo and in silico experimental systems to achieve these goals. For example, we utilise cell reprogramming technologies to generate induced pluripotent stem (iPS) cell lines from mouse and human dermal fibroblasts. Typically, fibroblasts are taken from patients with Parkinson's disease, Alzheimer's disease, Amytrophic Lateral Sclerosis, Huntington's disease, Epilepsy and Schizophrenia, and are exposed to a mixture of reprogramming factors. Once stable iPS cell lines have been generated, they are differentiated into neurons for biochemical characterization. These neurons are also used for elucidating mechanisms that underlie neurodegeneration, drug discovery and toxicity screening.

RECENT PUBLICATIONS:

McDonald AG, Tipton KF and Davey GP (2009) Mathematical modelling of metabolism., *The Biochemist*, June , p24-27.

Telford JE, Kilbride SM and Davey GP (2009). Complex I is rate-limiting for oxygen consumption in the nerve terminal. *J Biol. Chem*. 284: 9109-9114.

Kilbride SM, Telford JE, Tipton KF and Davey GP (2008). Partial inhibition of complex I activity increases Ca-independent glutamate release rates from depolarized synaptosomes. *J. Neurochem.* 106: 826-834.

Kilbride SM, Telford JE and Davey GP (2008). Age-related changes in H2O2 production and bioenergetics in rat brain synaptosomes. *Biochim. Biophys. Acta.* 1777: 783-788.

Pathak RU and Davey GP (2008). Complex I and energy thresholds in the brain. *Biochim. Biophys. Acta.* 1777: 777-882.

O'Sullivan J, Davey G, O'Sullivan M and Tipton KF (2007) Hydrogen peroxide derived from amine oxidation mediates the interaction between aminosugars and semicarbazide-sensitive amine oxidase. *J Neural Transm.* 114: 751-756.

McDonald, A., Tipton, K., O'Sullivan, J., Olivieri, G., Davey, G., Coonan, A.-M. and Fu, W. (2007) Modelling the roles of MAO and SSAO in glucose transport. *J. Neural Transm.* 114, 783-786.

RESEARCH FUNDING:

Science Foundation Ireland, Enterprise Ireland, Health Research Board, European Union, Industrial Development Authority

Name: Conor Houghton

Position: Lecturer in Mathematics

Contact details: School of Mathematics
Trinity College, Dublin
Telephone: 353-01-896-3542
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RESEARCH INTERESTS:

The principal interest of my laboratory is the mathematical description of neuronal signaling: the unifying theme of our research is the idea that the important features of spike trains, their information content and temporal structure, will be easy to calculate and study when a natural mathematical framework has been constructed. Our research involves pen-and-paper and computer calculations, often using electrophysiological data from experimental collaborators or from data repositories.

RECENT PUBLICATIONS:

Sparse coding of birdsong and receptive field structure in songbirds Garrett Greene, David Barrett, Kamal Sen and Conor Houghton, Network: *Computation in Neural Systems* 20 (2009) 162-177.

Tuning for criticality: a new hypothesis for sleep. Barak A. Pearlmutter and Conor J. Houghton, *Neural Computation* 21 (2009) 1622-1641.

Studying spike trains using a van Rossum metric with a synapse-like filter. Conor Houghton, *Journal of Computational Neuroscience* 26 (2009) 149-155.

A new multi-neuron spike-train metric. Conor Houghton and Kamal Sen, *Neural Computation* 20 (2008) 1495-1511.

RESEARCH FUNDING:

Science Foundation Ireland, Irish Research Council for Science, Engineering and Technology and the James S. McDonnell Foundation

Name: Prof. Kumlesh Dev

Position: Associate Professor of Neuroscience

Contact details: Department of Physiology
School of Medicine
Trinity College Dublin
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RESEARCH INTERESTS:

The Molecular Neuropharmacology group focuses on understanding the mechanisms underlying early events of Multiple Sclerosis, Parkinson's Disease and Alzheimer's Disease. We aim to identify novel drug targets for these diseases by utilising a range of functional genomic screens, biochemical and cellular assays, siRNA/lentiviral gene therapy and in vivo approaches. Our aim is to characterise novel proteins involved in the trafficking of sphingosine-1-phosphate and glutamate receptors. By controlling the surface expression of these proteins in a spatial and temporal manner, we aim to correct glial cell dysfunction and promote early events of neuronal survival. The eventual goal is to develop drugs that regulate receptor trafficking and thereby alter their function in a cell-specific and use-dependent fashion. Our ultimate objective is to identify new molecular pathways and targets, biomarkers and lead compounds for drug discovery purposes. The research activities draw upon collaborations in the academic, medical and industrial arenas.

RECENT PUBLICATIONS:

Chatterjee S, Szustakowski JD, Nanguneri NR, Mickanin C, Labow MA, Nohturfft A, Dev KK and Sivasankaran R (2009). Identification of Novel Genes and Pathways Regulating SREBP Transcriptional Activity. *PLoS ONE* 4: e5197.

Dev KK, Mullershausen F, Mattes H, Kuhn R, Bilbe G, Hoyer D and Mir A (2008). Brain S1P receptors: implication for fingolimod in the treatment of Multiple Sclerosis. *Pharmacol. Ther.* 117: 77-93.

Senechal Y, Prut L, Staufenbiel M, Natt F, Hoyer D, Wiessner C, and Dev KK. (2008). siRNA-mediated knockdown of APP reverses locomotor hyperactivity in the APP23 mouse model of Alzheimer's Disease. *Brain Res.* 1243: 124-133.

Osinde M, Clavaguera F, May-Nass R, Tolnay M and Dev KK (2008). Lentivirus Tau (P301S) expression in adult amyloid precursor protein (APP)-transgenic mice leads to tangle formation. *Neuropath Applied Neurobiol*. 34: 523–531.

Olson BL, Hock MB, Ekholm-Reed S, Wohlschlegel JA, Dev KK, Kralli A, and Reed SI (2008). SCFCdc4 acts antagonistically to the PGC-1{alpha} transcriptional coactivator by targeting it for ubiquitin-mediated proteolysis. *Genes Dev.* 22: 252-264.

RESEARCH FUNDING:

Science Foundation Ireland, Health Research Board, Enterprise Ireland, Wellcome Trust, Egyptian Government Travel Awards, Novartis Pharma Basel.

Name: Dr. Paul M. Dockree

Position: Lecturer in Psychology

Contact details: School of Psychology
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RESEARCH INTERESTS:

My research group focuses on understanding cognitive dysfunction following Traumatic Brain Injury (TBI) and developing new methods for cognitive rehabilitation. In collaboration with the National Rehabilitation Hospital, we are conducting a program of neuropsychological testing and electrophysiological recordings that is uniquely well placed to help dissect the clinical heterogeneity of TBI. The program aims to identify separable symptom-clusters in patients paving the way for different treatment trajectories. In partnership with Headway, we are beginning a cognitive rehabilitation program to address a clinical problem that TBI patients commonly report: difficulty concentrating in context of background noise or concurrent interference. This is known as impaired sensory gating and often means the patient is less able to attend, encode or recall the details of an episode clearly. We employ a multi-disciplinary approach combining and applying the expertise of cognitive neuroscientists, biomedical engineers, clinical psychologists and psychiatrists.

RECENT PUBLICATIONS:

Dockree P M, Kelly SP, Foxe JJ, Reilly RB, and Robertson IH (2007). Optimal sustained attention is linked to the spectral content of background EEG activity: greater ongoing tonic alpha (approximately 10 Hz) power supports successful phasic goal activation. *Eur J Neurosci.* 25: 900-907.

Dockree PM, Bellgrove MA, O'Keeffe FM, Moloney P, Aimola L, Carton S and Robertson IH (2006) Sustained attention in traumatic brain injury (TBI) and healthy controls: enhanced sensitivity with dual-task load. *Exp Brain Res.*168: 218-229.

Dockree PM, O'Keeffe FM, Moloney P, Bishara AJ, Carton S, Jacoby LL and Robertson IH (2006). Capture by misleading information and its false acceptance in patients with traumatic brain injury. *Brain,* 129: 128-140.

Dockree PM, Kelly SP, Robertson IH, Reilly RB and Foxe JJ (2005) Neurophysiological markers of alert responding during goal-directed behavior: A high-density electrical mapping study. *Neuroimage* 27, 587-601

Dockree PM, Kelly SP, Roche RA, Hogan MJ, Reilly RB and Robertson IH (2004) Behavioural and physiological impairments of sustained attention after traumatic brain injury. *Cogn Brain Res*. 20: 403-414.

RESEARCH FUNDING:

Health Research Board

Name: Dr. Gary Donohoe

Position: Senior Lecturer in Clinical Psychology

Contact details: Department of Psychiatry,
School of Medicine
Trinity College Dublin
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RESEARCH INTERESTS:

My interest is in the genetic, cognitive, and clinical aspects of schizophrenia and the related psychosis. Within the Neuropsychiatric Genetics Research Group at TCD, my work focuses on understanding cognitive measures and how they inter-relate, and using these to elucidate the role of candidate risk genes for schizophrenia. By combining clinical, behavioural, neurophysiological, and neuroimaging techniques, we can explore in vivo the impact of these variants on brain structure and function.

RECENT PUBLICATIONS:

Donohoe G, Morris DW, De Sanctis P, Magno E, Montesi JL, Garavan HP, Robertson IH, Javitt DC, Gill M, Corvin AP and Foxe JJ (2008). Early visual processing deficits in dysbindin-associated schizophrenia. *Biol. Psychiatry*. 63: 484-489.

Donohoe G, Morris DW, Robertson IH, McGhee KA, Murphy K, Kenny N, Clarke S, Gill M and Corvin AP (2007). DAOA ARG30LYS and verbal memory function in schizophrenia. *Mol. Psychiatry.* 9: 795-796.

Corvin A, Donohoe G, Nangle JM, Schwaiger S, Morris D and Gill M (2008). A dysbindin risk haplotype associated with less severe manic-type symptoms in psychosis. *Neurosci. Lett.* 431: 146-149.

Corvin A, Donohoe G, McGhee K, Murphy K, Kenny N, Schwaiger S, Nangle JM, Morris D and Gill M (2007). D-amino acid oxidase (DAO) genotype and mood symptomatology in schizophrenia. *Neurosci. Lett*. 426: 97-100.

Yang MS, Morris DW, Donohoe G, Kenny E, O'Dushalaine CT, Schwaiger S, Nangle JM, Clarke S, Scully P, Quinn J, Meagher D, Baldwin P, Crumlish N, O'Callaghan E, Waddington JL, Gill M and Corvin A (2008). Chitinase-3-Like 1 (CHI3L1) Gene and Schizophrenia: Genetic Association and a Potential Functional Mechanism. *Biol. Psychiatry.* 64: 98-103.

RESEARCH FUNDING:

National Alliance for Research on Schizophrenia and Depression, Science Foundation Ireland, Higher Education Authority, Wellcome Trust.

Name:	Prof. G Jane Farrar
Position:	Associate Professsor of Genetics
Contact details:	Smurfit Institute of Genetics, Trinity College Dublin Telephone: 353-01-896-3695 Email: gjfarrar@tcd.ie

RESEARCH INTERESTS:

My research imterests include the elucidation of the molecular pathogenesis of neurodegenerative disorders and in particular neurodegenerative disorders involving photoreceptor cell loss such as Retinitis Pigmentosa (RP) amongst others. In addition, I've been involved in the utilisation of genetic tools to simulate such disorders in model systems and to explore potential therapeutic approaches for such disorders. My research group comprises 6 post-doctoral scientists and 4 postgraduate students.

RECENT PUBLICATIONS:

Chadderton N, Millington-Ward S, Palfi A, O'Reilly M, Tuohy G, Humphries MM,Li T, Humphries P, Kenna PF, Farrar GJ. (2009). Improved retinal function in a mouse model of dominant retinitis pigmentosa following AAV-delivered gene therapy. *Mol. Ther.* 17: 593-599.

Tam LC, Kiang AS, Kennan A, Kenna PF, Chadderton N, Ader M, Palfi A, Aherne A, Ayuso C, Campbell M, Reynolds A, McKee A, Humphries MM, Farrar GJ and Humphries P (2008). Therapeutic benefit derived from RNAi-mediated ablation of IMPDH1 transcripts in a murine model of autosomal dominant retinitis pigmentosa (RP10). *Hum. Mol. Genet.* 17: 2084-2100.

Loscher CJ, Hokamp K, Wilson JH, Li T, Humphries P, Farrar GJ and Palfi A. (2008). A common microRNA signature in mouse models of retinal degeneration. *Exp. Eye Res*. 87: 529-534.

Campbell M, Kiang AS, Kenna PF, Kerskens C, Blau C, O'Dwyer L, Tivnan A, Kelly JA, Brankin B, Farrar GJ and Humphries P. (2008). RNAi-mediated reversible opening of the blood-brain barrier. *J. Gene. Med.* 10: 930-947.

O'Reilly M, Millington-Ward S, Palfi A, Chadderton N, Cronin TC, McNally N, Humphries MM, Humphries P, Kenna PF and Farrar GJ (2008). A transgenic mouse model for gene therapy of rhodopsin-linked Retinitis Pigmentosa. *Vision Res*. 48: 386-391.

O'Reilly M, Palfi A, Chadderton N, Millington-Ward S, Ader M, Cronin T, Tuohy T, Auricchio A, Hildinger M, Tivnan A, McNally N, Humphries MM, Kiang AS, Humphries P, Kenna PF and Farrar GJ (2007). RNA interference-mediated suppression and replacement of human rhodopsin in vivo. *Am. J. Hum. Genet.* 81: 127-135.

RESEARCH FUNDING:

Science Foundation Ireland, Enterprise Ireland, Health Research Board, Fighting Blindness, Wellcome Trust, European Union Framework programmes, Debra Ireland.

Name:	Prof. Thomas Frodl
Position:	Professor of Integrated Neuroimaging
Contact details:	Department of Psychiatry, School of Medicine Trinity College Dublin Telephone: 353-01-896-4181 Email:frodlt@tcd.

RESEARCH INTERESTS:

My research areas are in clinical neuroimaging and imaging genetics. Using multimodal imaging techniques and genetics I examine, how stress or other environmental factors interact with genetic polymorphisms on the structural and functional integrity of the brain. Research focus is in Affective Disorders like major depression or bipolar disorders, but also in personality disorders and adult attention deficit disorders, in order to understand the underlying neurobiological processes and to find markers for prediction of disease progression or for response to antidepressant treatment. Other projects deal with early detection of psychiatric diseases using these imaging methods like structural and functional MRI, diffusion tensor imaging and MR spectroscopy.

RECENT PUBLICATIONS:

Frodl T, Koutsouleris N, Bottlender R, Jäger M, Born C, Scupin I, Reiser M, Möller H-J and Meisenzahl EM (2008). Depression-related long-term Decline of Brain Morphology: Stress-toxicity? *Arch. Gen. Psychiatry* 65: 1156-1165.

Frodl T, Koutsouleris N, Bottlender R, Jäger M, Born C, Mörgenthaler M, Rupprecht R, Bondy B., Reiser M, Möller H-J and Meisenzahl EM (2008). Reduced gray matter brain volumes are associated with variants of the serotonin transporter gene in major depression. *Mol. Psychiatry* 13: 1093-1101.

Frodl T, Schüle C, Schmitt G, Born C, Baghai T, Zill P, Bottlender R, Rupprecht R, Bondy B, Reiser M, Möller H-J and Meisenzahl E. (2007). Brain Derived Neurotrophic Factor Val66met Polymorphism is associated with reduced Hippocampal Volumes in Major Depression. *Arch. Gen. Psychiatry* 63: 1-7.

Frodl T, Meisenzahl EM, Zill P, Baghai T, Rujescu D, Leinsinger G, Bottlender R, Schüle C, Zwanzger P, Engel RR, Rupprecht R, Bondy B, Reiser M and Möller H-J (2004). Reduced hippocampal volumes associated with the long variant of the serotonin transporter polymorphism in major depression. *Arch. Gen. Psychiatry* 61: 177-183.

Frodl T, Meisenzahl EM, Zetzsche T, Höhne T, Banac S, Schorr C, Jäger M, Leinsinger G, Bottlender R, Reiser M, and Möller H-J. (2004). Hippocampal and amygdala changes in patients with major depressive disorders and healthy controls during a 1-year follow-up. *J. Clin. Psychiatry* 65: 492-499.

RESEARCH FUNDING:

Eli Lilly International Foundation, Research Foundation-University Munich, Fridrich Baur Foundation

Name: Prof. Hugh Garavan

Position: Associate Professsor in Psychology

Contact details: Trinity College Institute of Neuroscience,
Trinity College Dublin.
Telephone: 353-01-896-8448
Email: Hugh.Garavan@tcd.ie

RESEARCH INTERESTS:

My group studies cognitive and affective processes in healthy controls and various clinical groups using experimental psychological and brain imaging techniques. The primary cognitive interest is on control functions (inhibition; attention; error detection) but interests include working and long-term memory, emotion regulation, and the neurobiology underpinning practice, learning and plasticity. The primary clinical interests include drug abuse with ongoing studies in cannabis, ecstasy, cocaine, opiates and alcohol users. Additional clinical interests are in schizophrenia and ADHD. Miscellaneous interests include individual differences and methodological issues in neuroimaging. All of these projects are conducted using functional and structural MRI with the latter including both volumetric analysis and diffusion-tensor imaging.

RECENT PUBLICATIONS:

Fassbender C, Hester R, Murphy K, Foxe JJ, Foxe DM and Garavan H. (2009). Prefrontal and midline interactions mediating behavioural control. *Eur. J. Neurosci.* 29: 181-187.

Chambers CD, Garavan H and Bellgrove MA. (2009). Insights into the neural basis of response inhibition from cognitive and clinical neuroscience. *Neurosci. Biobehav. Rev.* 33: 631-646.

Donohoe G, Morris DW, De Sanctis P, Magno E, Montesi JL, Garavan H, Robertson IH, Javitt DC, Gill M, Corvin AP and Foxe JJ (2008). Early Visual processing deficits in dysbindin-associated schizophrenia. *Biol. Psychiatry* 63: 484-489.

Nestor L, Roberts G, Garavan H and Hester R (2008). Deficits in learning and memory: parahippocampal hyperactivity and frontocortical hypoactivity in cannabis users. *NeuroImage.* 40: 1328–1339.

Chambers CD, Bellgrove MA, Gould IC, English T, Garavan H, McNaught E, Kamke M and Mattingley JB (2007). Dissociable mechanisms of cognitive control in human prefrontal cortex. *J. Neurophysiol.* 98: 3638-3647.

Hester R, Barre N, Mattingley JB, Foxe JJ and Garavan H (2007). Avoiding another mistake: Error and post-error neural activity associated with adaptive post-error response changes. *Cog. Affect. Behav. Neurosci.* 7: 317-326.

Garavan H and Hester R (2007). The Role of Cognitive Control in Cocaine Dependence. *Neuropsychol. Rev.* 17: 337-345.

RESEARCH FUNDING:

National Institute on Drug Abuse, National Instiute of Health (USA), European Union Health Research Board

Name: Prof. Michael Gill

Position: Professor of Psychiatry

Contact details: Department of Psychiatry,
School of Medicine
Trinity College Dublin
Telephone: 353-01-896-2241
Email: mgill@tcd.ie

RESEARCH INTERESTS:

The overall strategy of Prof Gill's research is to study the relationships between phenotype and genotype in three key neuropsychiatric disorders; Psychoses, Autism and ADHD. Step one, gene hunting, is highly multidisciplinary and involves ascertaining large family and individual case samples and measuring clinical, neuropsychological, neurophysiological and neuroimaging phenotypes, and relating these to genotype at candidate genes and regions. We have developed a series of large and highly valuable family and individual case resources over the last ten years. Whole genome association approaches are underway or are planned. Step two, functional genomics, involves the focused examination of the function of demonstrated candidate genes, and their specific involvement in disease aetiology.

RECENT PUBLICATIONS:

Hawi Z, Kent L, Hill M, Anney RJ, Brookes KJ, Barry E, Franke B, Banaschewski T, Buitelaar J, Ebstein R, Miranda A, Oades RD, Roeyers H, Rothenberger A, Sergeant J, Sonuga-Barke E, Steinhausen HC, Faraone SV, Asherson P and Gill M. (2009). ADHD and DAT1: Further evidence of paternal over-transmission of risk alleles and haplotype. *Am. J. Med. Genet. B Neuropsychiatr. Genet.* [Epub ahead of print].

Molecular Genetics of Schizophrenia Collaboration. (2009). Analysis of 10 independent samples provides evidence for association between schizophrenia and a SNP flanking fibroblast growth factor receptor 2. *Mol. Psychiatry.* 14: 30-36.

Psychiatric GWAS Consortium Coordinating Committee, Cichon S, Craddock N, Daly M, Faraone SV, Gejman PV, Kelsoe J, Lehner T, Levinson DF, Moran A, Sklar P and Sullivan PF. (2009). Genomewide association studies: history, rationale, and prospects for psychiatric disorders. *Am. J. Psychiatry.* 166: 540-556.

Wellcome Trust Case Control Consortium. (2008). Collaborative genome-wide association analysis supports a role for ANK3 and CACNA1C in bipolar disorder. *Nat Genet.* 40: 1056-1058.

Bellgrove MA, Chambers CD, Johnson KA, Daibhis A, Daly M, Hawi Z, Lambert D, Gill M and Robertson IH (2007). Dopaminergic genotype biases spatial attention in healthy children. *Mol. Psychiatry* 12: 786-792.

Hawi Z, Segurado R, Conroy J, Sheehan K, Lowe N, Kirley A, Shields D, Fitzgerald M, Gallagher L and Gill M (2005). Preferential Transmission of Paternal Alleles at Risk Genes in Attention Deficit/Hyperactivity Disorder. *Am. J. Hum. Genet.* 77: 958-965.

RESEARCH FUNDING:

National Institute of Mental Health

Name: Prof. Harald Hampel

Position: Professor and Chair of Psychiatry,
Trinity College
Consultant in General Adult and Psychiatry of Old Age
Head of the Alzheimer Memorial Center,
Univ Munich

Contact details: Discipline of Psychiatry, School of Medicine
Trinity College Dublin
Telephone: 353-01-896-3706
Email: Harald.Hampel@tcd.ie

RESEARCH INTERESTS:

Discovery and qualification of biological markers in blood and cerebrospinal fluid. Here he contributed seminal findings regarding phosphorylated tau, abeta-antibodies and BACE 1 functional proteins as core biological markers of AD. Currently he is developing a panel of hypothesis driven biomarkers in blood. Development and qualification of structural & functional neuroimaging markers in neurodegenerative disorders with focus on Alzheimer's disease (AD). His group has introduced new MR-markers of basal forebrain changes validated against post-mortem obtained brain scans. Multivariate analysis tools were developed to track white matter changes, voxel-based DTI analysis and tractography of neuronal networks, demonstrating a region-specific pattern of progressive fiber tract disintegration in the AD brain. Voxel- and deformation-based morphometry and cortical thickness measurement. For functional MRI assessment, he developed a connectivity related approach that showed brain changes in subjects at risk of AD even before the onset of the dementia syndrome. His current neuroimaging research focuses on understanding how the brain constructs networks of interacting regions to perform cognitive tasks, especially those associated with memory and attention, and how these networks are altered in brain disorders.

RECENT PUBLICATIONS:

Blood-Based Microcirculation Markers in Alzheimer's Disease-Diagnostic Value of Midregional Pro-atrial Natriuretic Peptide/C-terminal Endothelin-1 Precursor Fragment Ratio.
Buerger K, Ernst A, Ewers M, Uspenskaya O, Omerovic M, Morgenthaler NG, Knauer K, Bergmann A, Hampel H. *Biol Psychiatry.* 2009 Apr 1. [Epub, ahead of print]

Ewers M, Zhong Z, Bürger K, Wallin A, Blennow K, Teipel SJ, Shen Y and Hampel H (2008). Increased CSF-BACE1 activity is associated with ApoE-ϵ4 genotype in subjects with mild cognitive impairment and Alzheimer's disease. *BRAIN*.131 (Pt 5)

Ewers M, Buerger K, Teipel SJ, Scheltens P, Schroeder J, Zinkowsky R, Bouwman FH, Schoenknecht P, Schoonenboom NSM, Andreasen N, DeBernardis JF, Kerkman DJ, Heindl B, Blennow K and Hampel H (2007). Multicenter assessment of CSF-phosphorylated tau for the prediction of conversion of MCI. *Neurology.* 69(24): 2205-12.

Bürger K, Ewers M, Pirttilä T, Zinkowski R, Alafuzoff I, Teipel SJ, DeBernardis J, Kerkman D, McCulloch C, Soininen H and Hampel H. CSF phosphorylated tau protein correlates with neocortical neurofibrillary pathology in Alzheimer's disease. *BRAIN.* 129: 3035-41.

RESEARCH FUNDING:

Science Foundation Ireland, Enterprise Ireland, Health Research Board (HRB), Wellcome Trust, European Commission, National Institute of Health, Alzheimer Association.

Name: Prof. Orla Hardiman

Position: Clinical Professor of Neurology
Consultant Neurologist at the National Neuroscience Centre
Director of the National ALS Clinic & Irish ALS Research Group

Contact details: Beaumont Hospital
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Email: oral@hardiman.net

RESEARCH INTERESTS:

My primary research interests include the epidemiology and pathogenesis of amyotrophic lateral sclerosis (ALS) with particular reference to the identification of genetic and environmental susceptibility factors. My internationally-recognized group recently identified an important new susceptibility gene for ALS, which occurs with higher frequency in populations of Celtic extraction. The group is in active collaboration with many of the major ALS centres in Europe and the USA, and is a member of the US based Genome Wide Association Consortium for ALS. Recent work has also focused on the clinical and genetic overlap between ALS and frontotemporal dementia, for which I have received one of only eight prestigious Health Research Board (HRB) Clinician Scientist Awards.

RECENT PUBLICATIONS:

Zaldivar T, Gutierrez J, Lara G, Carbonara M, Logroscino G and Hardiman O (2009). Reduced frequency of ALS in an ethnically mixed population: A population-based mortality study. *Neurology.* 72: 1640-1645.

Phukan J and Hardiman O (2009). The management of amyotrophic lateral sclerosis. *J. Neurol.* 256: 176-186.

Cronin S, Berger S, Ding J, Schymick JC, Washecka N, Hernandez DG, Greenway MJ, Bradley DG, Traynor BJ and Hardiman O. (2007). A genome-wide association study of sporadic ALS in a homogenous Irish population. *Hum. Mol. Genet.* 17: 768-774.

Fallis B and Hardiman O. (2008). Family Aggregation of Neurodegeneration in ALS. *Amyotroph. Later. Scler.* 10: 95-98.

Phukan J, Pender N and Hardiman O. (2007). Cognitive decline in ALS. *Lancet Neurology.* 6: 994-1003.

Greenway MJ, Andersen PM, Russ C, Ennis S, Cashman S, Donaghy C, Patterson V, Swingler R, Morrison KE, Prehn JP, Green A, Acharya KR, Brown RH and Hardiman O. (2006). Loss-of-function ANG mutations segregate with familial and 'sporadic' amyotrophic lateral sclerosis. *Nat. Genetics.* 38: 411-413

RESEARCH FUNDING:

Health Research Board, Muscular Dystrophy USA, Amyotrophic Lateral Sclerosis Association, Irish Motor Neurone Disease Association, Irish Register of Amyotrophic Lateral Sclerosis

Name: Dr. Andrew Harkin

Position: Lecturer in Pharmacology

Contact details: School of Pharmacy and
Pharmaceutical Sciences,
Trinity College Dublin
Telephone: 353-01-896-2807
Email: acorvin@tcd.ie

RESEARCH INTERESTS:

My research is primarily focused in the thematic areas of depression and drug abuse. Current work is focused on the role of the glutamate N-methyl-D-aspartic acid receptor (NMDA-R) and the NMDA-nitric oxide (NO)-cGMP intra-neuronal signalling pathway in antidepressant treatment. We are testing agents which influence this pathway for the development of more effective and faster acting antidepressants. Inhibitors of the NMDA-R have shown promise as rapid acting antidepressants. Neuronal NO synthase (nNOS) is a down stream target of NMDA-R and we have reported that inhibition of nNOS produces antidepressant activity in preclinical models. Other research in the group is concerned with the toxicity of recreational drugs including MDMA ("ecstasy"), cocaine and caffeine, their interactions and the health consequences associated with their use.

RECENT PUBLICATIONS:

Durkin S, Prendergast A and Harkin A (2008). Reduced efficacy of fluoxetine following MDMA ("Ecstasy")-induced serotonin loss in rats. *Prog. Neuropsychopharmacol. Biol. Psychiatry.* 32:1894-901.

McNamara R, Maginn M and Harkin A (2007). Caffeine induces a profound and persistent tachycardia in response to MDMA ("Ecstasy") administration. *Eur J Pharmacol.* 555: 194-198.

McNamara R, Kerans A, O'Neill B and Harkin A (2006). Caffeine promotes hyperthermia and serotonergic loss following co-administration of the substituted amphetamines, MDMA ("Ecstasy") and MDA ("Love"). *Neuropharmacology.* 50: 69-80.

Connor TJ, Brewer C, Kelly JP and Harkin A (2005). Acute stress suppresses pro-inflammatory cytokines TNF-α and IL-1β independent of a catecholamine-driven increase in IL-10 production. *Journal of Neuroimmunology.* 159: 119-128.

Harkin A, Connor TJ, Burns MP and Kelly JP (2004). Nitric oxide synthase inhibitors augment the effect of serotonin re-uptake inhibitors in the mouse forced swimming test. *European Neuropsychopharmacology* 14: 274-281.

Harkin A, Connor TJ, Walsh M, St. John N and Kelly JP (2003). Serotonergic mediation of the antidepressant-like effects of nitric oxide synthase inhibitors. *Neuropharmacology.* 44: 616-623. .

RESEARCH FUNDING:

Health Research Board, European Union, Irish Research Council for Science, Engineering and Technology, Science Foundation Ireland

Name:	Prof. Peter Humphries
Position:	Professor of Medical Molecular Genetics
Contact details:	Department of Genetics, Trinity College Dublin Telephone: 353-01-896-1482 Email: pete.humphries@tcd.ie

RESEARCH INTERESTS:

My research investigates the molecular genetics of degenerative diseases of the retina. Milestones have included the localization of the first and second genes to be implicated in autosomal dominant RP (these genes encode the photoreactive pigment rhodopsin and the structural component of photoreceptor neurones, peripherin), the localization and functional characterization of a gene causing the RP10 form of RP, encoding the rate limiting enzyme of the de novo pathway of GTP biosynthesis, and the identification of mutations within the MTTS2 gene in sensorineuronal deafness and RP. Current research involves ongoing studies of the molecular genetics of RP and related conditions and the development of novel therapeutics based upon such knowledge (see also Drs. Farrar and Kenna). Future projects will include quantitative analysis of retinal transcripts in respect to therapeutic approaches targeting transcripts from retinopathy genes and assessment of techniques for delivery to ocular tissue of potentially therapeutic materials, including use of iontophoresis and electroporation.

RECENT PUBLICATIONS:

Chadderton N, Millington-Ward S, Palfi A, O'Reilly M, Tuohy G, Humphries MM, Li T, Humphries P, Kenna PF and Farrar GJ. (2009). Improved retinal function in a mouse model of dominant retinitis pigmentosa following AAV-delivered gene therapy. *Mol. Ther.* 17: 593-599.

Campbell M, Kiang AS, Kenna PF, Kerskens C, Blau C, O'Dwyer L, Tivnan A, Kelly JA, Brankin B, Farrar GJ and Humphries P (2008). RNAi-mediated reversible opening of the blood-brain barrier. *J. Gene. Med.* 10: 930-947.

Tam LC, Kiang AS, Kennan A, Kenna PF, Chadderton N, Ader M, Palfi A, Aherne A, Ayuso C, Campbell M, Reynolds A, McKee A, Humphries MM, Farrar GJ, Humphries P. (2008). Therapeutic benefit derived from RNAi-mediated ablation of IMPDH1 transcripts in a murine model of autosomal dominant retinitis pigmentosa (RP10). *Hum. Mol. Genet.* 17: 2084-2100.

Loscher CJ, Hokamp K, Wilson JH, Li T, Humphries P, Farrar GJ and Palfi A. (2008). A common microRNA signature in mouse models of retinal degeneration. *Exp. Eye Res.* 87: 529-534.

O'Reilly M, Palfi A, Chadderton N, Millington-Ward S, Ader M, Cronin T, Tuohy T, Auricchio A, Hildingr M, Tivnan A, McNally M, Humphries MM, Kiang A-S, Humphries P, Kenna PF and Farrar GJ. RNAi-mediated suppression and replacement of human rhodopsin in vivo. *Am. J. Human Genet.* 81: 127-135.

Kennan A, Aherne and Humphries P. (2005). Light in retinitis pigmentosa. *Trends in Genetics* 21: 103-110.

RESEARCH FUNDING:

Enterprise Ireland

Name: Dr. Áine Kelly

Position: Senior Lecturer in Physiology

Contact details: Department of Physiology,
Trinity College Dublin
Telephone: 353-01-896-3794
Email:aikelly@tcd.ie

RESEARCH INTERESTS:

My research interests centre on the roles of the neurotrophic factors in cognitive function, particularly hippocampal-dependent learning. In my laboratory, we use a combination of in vivo and in vitro techniques including animal learning and behaviour, immunocytochemistry and a range of biochemical and moleclar techniques. We are particularly interested in the cellular mechanisms by which interventions such as environmental enrichment and physical exercise can improve cognition in young, healthy laboratory animals and protect against degenerative changes caused by ageing and by experimentally-induced neuronal cell damage.

RECENT PUBLICATIONS:

Griffin EW, Bechara RG, Birch AM and Kelly AM (2009) Exercise enhances recognition memory in the rat: evidence for a BDNF-related mechanism. *Hippocampus* (In press)

O'Callaghan RM, Griffin EW and Kelly AM (2009) Long-term treadmill exposure protects against age-related neurodegenerative change in the rat hippocampus. *Hippocampus* (In press).

Hennigan A, Callaghan CK, Kealy J, Rouine J and Kelly AM (2009). Deficits in LTP and recognition memory in the genetically hypertensive rat are associated with decreased expression of neurotrophic factors and their receptors in the dentate gyrus. *Behav. Brain Res.* 197: 371-377

Larkin AE, Fahey B, Gobbo O, Callaghan CK, Cahill E, O'Mara SM and Kelly ÁM (2008) Blockade of NMDA receptors pre-training, but not post-training, impairs object displacement learning in the rat. *Brain Res.* 1199:126-132

O'Callaghan RM, Ohle R and Kelly ÁM (2007). The effects of forced exercise on hippocampal plasticity in the rat: a comparison of LTP, spatial- and non-spatial learning. *Behav. Brain Res.* 176: 362-366

Hennigan A, O'Callaghan RM and Kelly ÁM (2007). Neurotrophins and their receptors: roles in plasticity, neurodegeneration and neuroprotection. *Biochem. Soc. Trans.* 35: 424-427

RESEARCH FUNDING:

Science Foundation Ireland, Health Research Board, Irish Research Council for Science, Engineering and Technology

Name: Dr. Julie Kelly

Position: Senior Research Lecturer

Contact details: School of Biochemistry and Immunology
Trinity College Dublin
Telephone: 353-01-896-8449
Email: kellyja@tcd.ie

RESEARCH INTERESTS:

Dr Kelly has broad research interests in understanding the roles of neuropeptides in the central nervous system (CNS). Currently, a key focus of her research relates to investigating the functions of thyrotropin-releasing hormone (TRH) in the CNS and to the development of TRH-based neurotherapeutics. Critically, clinical use of native TRH is hindered due to its rapid degradation. Dr Kelly's research has led to the discovery of novel compounds that provide a means to reduce TRH degradation and realize a longstanding pharmaceutical industry goal. These patent-protected compounds represent a unique opportunity to unlock the clinical potential of the actions of TRH and thereby, offer an innovative platform technology for the treatment of a wide range of CNS disorders with unmet clinical need. Preclinical development of the lead compound, as well as multidisciplinary research to gain a greater understanding of the therapeutic actions of TRH and to advance the development of other TRH-related neurotherapeutics, is ongoing in collaboration with several other research groups located internationally and nationally and, in particular, within TCIN.

RECENT PUBLICATIONS:

Campbell M, Kiang AS, Kenna PF, Kerskens C, Blau C, O'Dwyer L, Tivnan A, Kelly JA, Brankin B, Farrar GJ and Humphries P (2008). RNAi-mediated reversible opening of the blood-brain barrier. *J. Gene. Med.* 10: 930-947.

Hogan N, O'Boyle KM, Hinkle PM and Kelly JA (2008). A novel TRH analog, Glp-Asn-Pro-D-Tyr-D-TrpNH2, binds to [3H][3-Me-His2]TRH-labelled sites in rat hippocampus and cortex but not pituitary or heterologous cells expressing TRHR1 or TRHR2. *Neurosci. Lett.* 431: 26-30.

Scalabrino GA, Hogan N, O'Boyle KM, Slator GR, Gregg DJ, Fitchett CM, Draper SM, Bennett GW, Hinkle PM, Bauer K, Williams CH, Tipton KF and Kelly JA (2007). Discovery of a dual action first-in-class peptide that mimics and enhances CNS-mediated actions of thyrotropin-releasing hormone, *Neuropharmacology.* 52: 1472-1481.

Kelly JA, Scalabrino GA, Slator GR, Cullen AA, Gilmer JF, Lloyd DG, Bennett GW, Bauer K, Tipton KF and Williams CH (2005). Structure-activity studies with high-affinity inhibitors of pyroglutamyl-peptidase II. *Biochem. J.* 389: 569-576.

Kelly JA, Slator GR, Tipton KF, Williams CH and Bauer K (2000). Kinetic investigation of the specificity of porcine brain thyrotropin-releasing hormone-degrading ectoenzyme for thyrotropin-releasing hormone-like peptides. *J. Biol. Chem.* 275: 16746-16751.

RESEARCH FUNDING:

Wellcome Trust, Science Foundation Ireland, Enterprise Ireland, Health Research Board

Name:	Dr. Paul Kenna
Position:	Senior Clinical Research Fellow in Genetics
Contact details:	Department of Genetics, Trinity College Dublin Telephone: 353-01-896-1000 Email: paul.kenna@tcd.ie

RESEARCH INTERESTS:

Dr Paul Kenna is a Senior Clinical Research Fellow in the Ocular Genetics Unit at the Smurfit Institute in Trinity College and has collaborated with Prof. Peter Humphries and Dr. Jane Farrar for over 15 years in investigations into the molecular genetic causes of inherited blindness, blistering skin disease and brittle bone disease. This work has resulted in the identification of a number of novel disease-causing genes in these conditions, including the first gene to be implicated as causative in any form of autosomal dominantly inherited RP. A fully trained clinical ophthalmologist, in recent years he has focused on the delivery of potentially therapeutic gene constructs to the degenerating retina in murine models of inherited retinopathies and in the analysis of the effects on retinal function. Dr. Kenna has developed considerable expertise in the electrophysiological assessment of retinal function in animals and humans. Together with Dr. Jane Farrar and Prof. Peter Humphries he holds three patents on strategies designed to overcome genetic heterogeneity in autosomal dominant diseases and is a founder of Optigen Technologies, a Trinity College campus company established to exploit these patents.

RECENT PUBLICATIONS:

Chadderton N, Millington-Ward S, Palfi A, O'Reilly M, Tuohy G, Humphries MM, Li T, Humphries P, Kenna PF, Farrar GJ (2009). Improved retinal function in a mouse model of dominant retinitis pigmentosa following AAV-delivered gene therapy. *Mol. Ther.* 17: 593-599.

Reynolds AL, Farrar GJ, Humphries P, Kenna PF (2008). Variation in the electroretinogram of C57BL/6 substrains of mouse. *Adv. Exp. Med. Biol*. 613: 383-391.

Reynolds AL, Danciger M, Farrar GJ, Humphries P, Kenna PF. (2008). Influence of a quantitative trait locus on mouse chromosome 19 to the light-adapted electroretinogram. *Invest. Ophthalmol. Vis. Sci.* 49: 4058-4063.

Bartsch U, Oriyakhel W, Kenna PF, Linke S, Richard G, Petrowitz B, Humphries P, Farrar GJ and Ader M (2008). Retinal cells integrate into the outer nuclear layer and differentiate into mature photoreceptors after subretinal transplantation into adult mice. *Exp. Eye Res.* 86: 691-700.

Tam LC, Kiang AS, Kennan A, Kenna PF, Chadderton N, Ader M, Palfi A, Aherne A, Ayuso C, Campbell M, Reynolds A, McKee A, Humphries MM, Farrar GJ and Humphries P (2008). Therapeutic benefit derived from RNAi-mediated ablation of IMPDH1 transcripts in a murine model of autosomal dominant retinitis pigmentosa (RP10). *Hum. Mol. Genet.* 17: 2084-2100.

O'Reilly M, O'Neill B, Palfi A, Kenna P, Humphries P and Farrar J (2003). Generation and analysis of a transgenic mouse model with a modified human rhodopsin replacement gene with therapeutic potential. *Am. J. Hum. Genet*. 73: 625

RESEARCH FUNDING:

Enterprise Ireland

Name: Prof. Rose-Anne Kenny

Position: Professor of Medical Gerontology

Contact details: Department of Medical Gerontology
Trinity Health Sciences Centre
St. James's Hospital Dublin 8.
Telephone: 353-01-428-4182
Email: rkenny@tcd.ie

RESEARCH INTERESTS:

Professor Rose Anne Kenny's research interests are in neurocardiovascular function in ageing. The overarching aims of the research programmes are to unpick the mechanisms for cardiovascular and cerebral dysfunction in the context of falls, blackouts, cognitive impairment and dementia. The research involves collaborative partnership with disciplines from basic science (developing animal modules of cardiovascular and cerebral dysfunction) through to health service development and implementation. She has conducted longitudinal cohort studies of vascular factors in cognitive impairment and stroke and is now lead PI for the Irish Longitudinal Study of Ageing (TILDA). Other major extant research programs include assistive technologies in ageing in collaboration with INTEL and IDA- TRIL; Health Research Board (HRB)-translational program of cardiovascular risk factors for conversion of cognitive impairment to dementia and new treatment strategies for dementia sub types.

RECENT PUBLICATIONS:

Kennelly SP, Lawlor BA and Kenny RA (2009). Blood pressure and the risk for dementia: a double edged sword. *Ageing Res. Rev.* 8: 61-70.

Harbison JA, Walsh S, Kenny RA. (2009) Hypertension and daytime hypotension found on ambulatory blood pressure is associated with fatigue following stroke and TIA. *QJM.* 102:109-115.

Parry, SW, Fearson R, Steen, N, Newton JL, Tryambake P and Kenny RA (2008). Evidence-based algorithms and the management of falls and syncope presenting to acute medical services. *Clin. Med*. 8: 157-162.

CG McMahon, R Kenny, K Bennett, and E Kirkman (2008). Modification of acute cardiovascular homeostatic responses to hemorrhage following mild to moderate traumatic brain injury. *Crit. Care Med.* 36: 216-124.

Miller VM, Kalaria RN, Hall R, Oakley AE and Kenny RA (2007). Medullary microvessel degeneration in multiple system atrophy. *Neurobiol. Dis.* 26(3): 615-622.

Rowan EN, Dickinson HO, Stephens S, Ballard C, Kalaria R and Kenny RA (2007). Homocysteine and post-stroke cognitive decline. *Age Ageing.* 36: 339-343.

RESEARCH FUNDING:

The Atlantic Philanthropies, Irish Life Plc, Health Research Board, The Roskamp Institute, Intel/Industrial Development Authority, GlaxoSmithKline/Industrial Development Authority, Science Foundation Ireland.

Name:	Dr. Christian Kerskens
Position:	Lead physicist
Contact details:	Trinity College Institute of Neuroscience, Trinity College Dublin Telephone: 353-01-896-8470 Email: christian.kerskens@tcd.i

RESEARCH INTERESTS:

My current research interests include an investigation of NMR contrast mechanism of functional brain activations and the underlying neurovascular coupling, mechanisms of diffusion contrast in NMR, modeling of flow and diffusion in biological systems, and physiological noise. Current work is also focused on direct detection of cell activation with NMR and the development of NMR methods for methodological improvements and in utilization to provide information of value in medical diagnosis and cognitive neuroscience.

RECENT PUBLICATIONS:

Gun'Ko Y, Corr S, Byrne S, Brougham D, Lynch M, Kerskens C, O' Dwyer,L, Tekourite R and Meledandri C (2008). Linear assemblies of magnetic nanoparticles as MRI contrast agents. *J. Am. Chem. Soc.* 130: 5214-5215.

Brunecker P, Endres M, Nolte C, Schultze J, Wegener S, Jungehulsing G, Mueller B and Kerskens C (2008). Evaluation of an AIF correction algorithm for dynamic susceptibility contrast-enhanced perfusion MRI. *Magn. Reson. Med.* 60: 102-110.

Kelly M, Blau C, Gabbo O and Kerskens CM (2008). Bolus-tracking arterial spin labeling; Theoretical and Experimental Result. *Phys. Med. Biol.* 54: 1235-1251.

Campbell M, Kiang AS, Kenna P, Kerskens C, Blau C, O'Dwyer L, Farrar J and Humphries P 2008. Transient blood brain barrier breakage by RNA interference of Claudin-5. *J. Gene Med.* 10: 930-947.

Flamini V, Kerskens C and Lally C (2008). Characterization of the 3D Fibre Distribution in a Porcine Aoarta using diffusion tensor imaging, European Society of Biomechanics. *Lucerne Switzerland.*

RESEARCH FUNDING:

Irish Research Council for Science, Engineering and Technology, Enterprise Ireland, Health Research Board

Name:	Prof. Khurshid Ahmad
Position:	Professor of Computer Science
Contact details:	Department of Computer Science, Trinity College Dublin Telephone: 353-01-896-8429 Email: kahmad@tcd.ie

RESEARCH INTERESTS:

My theoretical interests are in neural computing, in terminology and ontology, and in natural language processing, especially information extraction. I am motivated by the way humans deal with information transmitted in different modalities – texts, images, numbers, diagrams. My research in neural computing has led to multi-net neural systems that can mimic the evolution of language and numerosity. Multi-net systems were used in co-locating images and their textual descriptions. My work in terminology and ontology relates to the automatic extraction and deployment of terminology of specialist disciplines in applications as diverse as translation and information extraction; work in ontology has helped develop systems that can track growth of knowledge from early theoretical stages onto patenting and into the market place. The practical objective is to create information systems that can not only deal with information in a number of different modalities but can also learn to deal with different modalities. I teach courses on AI, Neural Networks and Knowledge Management.

RECENT PUBLICATIONS:

Mesiar R, Mesiarova-Zemenkova A and Ahmad K (2009). Level-dependent Sugeno integral, *IEEE Transactions on Fuzzy Systems.* 17: 167 - 172

Ahmad K (2009). Sentiment Analysis & Emotions and Metaphors: A Multi-disciplinary Perspective. Heidleberg. *Springer Verlag.* 1 - 200

Daly N, Kearney C and Ahmad K (2009). Correlating market movements with consumer confidence and sentiments: a longitudinal study, Text Mining Services Leipzig, Germany, 23 March 2009, edited by Gerhard Heyer, *Leipzeiger Beitrage zur Informatik*. 169 - 180

Remus R, Heyer G and Ahmad K (2009). Sentiment in German language news and blogs,and the DAX, Text Mining Services Leipzig, edited by Gerhard Heyer. Leipziger Beitrage zur Informatik 149158.

Ahmad K (2008). Emotion, Metaphor, Ontology & Terminology, Workshop. In: 2008 Language Resources and Evaluation Conf., 2008, Marrakesh, Morocco,
Khurshid Ahmad, ELDA, Paris (manuscript with Springer-Verlag AG, Berlin). 1-108.

RESEARCH FUNDING:

European Union's Strategic Programme for Research in IT (Information Society Technologies and Framework V/ESPRIT), the UK Engineering and Physical Sciences Research Council, and the UK National Rivers Authority

Name: Dr. Juan-Pablo Labrador

Position: Lecturer in Genetics

Contact details: Smurfit Institute of Genetics,
Trinity College Dublin
Dublin 2
Telephone: 353-01-896-1966
Email: jp.labrador@tcd.ie

RESEARCH INTERESTS:

It is estimated that in an adult human there are of the order of hundreds of billions of neurons, each of which establishes specific connections. Surface molecules expressed by each neuron will largely determine how these connections take place. Many transcription factors that control neuronal subtype specification have been identified. However, how do they ultimately control the specification of the vast array of different neurons, and how the expression of surface molecules is regulated in them is unknown. My lab is trying to understand how transcriptional codes specify neuronal identity and regulate the expression of membrane molecules. I employ a number of in vitro and in vivo approaches including high-throughput mRNA profiling, ChIP-chip, ChIP-Seq, primary neuronal culture, confocal laser scanning microscopy and a range of biochemical & molecular techniques. My research group comprises 2 post-doctoral researchers and 2 postgraduate students.

RECENT PUBLICATIONS:

Labrador JP, O'Keefe D, Yoshikawa S, McKinnon RD, Thomas JB and Bashaw GJ (2005). The homeobox transcription factor even-skipped regulates netrin-receptor expression to control dorsal motor-axon projections in Drosophila. *Curr Biol.*15: 1413-1419.

Hu H, Li M, Labrador JP, McEwen J, Lai EC, Goodman CS and Bashaw GJ (2005). Cross GTPase-activating protein (CrossGAP)/Vilse links the Roundabout receptor to Rac to regulate midline repulsion.*Proc Natl Acad Sci U S A.*102: 4613-4618.

Fan X, Labrador JP, Hing H and Bashaw GJ (2003). Slit stimulation recruits Dock and Pak to the roundabout receptor and increases Rac activity to regulate axon repulsion at the CNS midline. *Neuron.* 40: 113-127.

Ikeda K, Wang LH, Torres R, Zhao H, Olaso E, Eng FJ, Labrador P, Klein R, Lovett D, Yancopoulos GD, Friedman SL and Lin HC (2002). Discoidin domain receptor 2 interacts with Src and Shc following its activation by type I collagen. *J Biol Chem.* 277:19206-19212.

Olaso E, Labrador JP, Wang L, Ikeda K, Eng FJ, Klein R, Lovett DH, Lin HC and Friedman SL (2002). Discoidin domain receptor 2 regulates fibroblast proliferation and migration through the extracellular matrix in association with transcriptional activation of matrix metalloproteinase-2. *J Biol Chem.* 277: 3606-3613.

RESEARCH FUNDING:

Science Foundation Ireland, Enterprise Ireland, Deutsche-Forschungsgemeinschaft, Irish Research Council for Science, Engineering and Technology

Name: Prof. Brian Lawlor

Position: Conolly Norman Professor of Old Age Psychiatry
Consultant Psychiatrist at St James's Hospital
Director of the Memory Disorders Clinic at M.I.R.A., St James's Hospital
Clinical Director of Psychiatry, St James's Hospital

Contact details: Department of Psychiatry,
St James' Hospital,
Telephone: 353-01-249-3283
Email: blawlor@stpatsmail.com

RESEARCH INTERESTS:

My research interests are in the early detection, diagnosis and treatment of Alzheimer's disease, the neurobiology and treatment of behavioural and psychological symptoms in dementia and mental disorders in the community dwelling elderly. The overarching aims of the research programmes are to develop clinical, neuropsychological and biological markers of Alzheimer's disease at the earliest possible stage and to test promising new interventions in clinical populations. This research involves collaborative partnership with disciplines from basic science (developing animal models of Alzheimer's disease) through to health service development, clinical trials and implementation. I have conducted longitudinal cohort studies of Alzheimer's disease in clinic settings and cross sectional and longitudinal studies of community dwelling healthy older people and those with mental disorders.

RECENT PUBLICATIONS:

Kennelly SP, Lawlor BA and Kenny RA. (2009) Blood pressure and the risk for dementia: a double edged sword. *Ageing Res. Rev.* 8: 61-70.

Blanco-Campal A, Coen RF, Lawlor BA, Walsh JB and Burke TE. (2009). Detection of prospective memory deficits in mild cognitive impairment of suspected Alzheimer's disease etiology using a novel event-based prospective memory task. *J. Int. Neuropsychol. Soc*. 15: 154-159.

Lynch CA, Moran M and Lawlor BA (2008). Firearms and dementia: a smoking gun? *Int. J. Geriatr. Psychiatry.* 1: 1-6.

Morgan AR, Hamilton G, Turic D, Jehu L, Harold D, Abraham R, Hollingworth P, Moskvina V, Brayne C, Rubinsztein DC, Lynch A, Lawlor B, Gill M, O'Donovan M, Powell J, Lovestone S, Williams J and Owen MJ (2007). Association analysis of 528 intra-genic SNPs in a region of chromosome 10 linked to late onset Alzheimer's disease. *Am. J. Med. Genet. B Neuropsychiatr. Genet.* 147B: 727-731.

Connelly PJ, Passmore AP and Lawlor BA (2007). The treatment of mild Alzheimer's disease post-NICE. *Int. J. Geriatr. Psychiatry.* 22: 1262-1263

Morgan AR, Turic D, Jehu L, Hamilton G, Hollingworth P, Moskvina V, Jones L, Lovestone S, Brayne C, Rubinsztein DC, Lawlor B, Gill M, O'donovan MC, Owen MJ and Williams J (2007). Association studies of 23 positional/functional candidate genes on chromosome 10 in late-onset Alzheimer's disease. *Am. J. Med. Genet. B Neuropsychiatr. Genet*. 144B: 762-770..

RESEARCH FUNDING:

Health Research Board, Intel/Industrial Development Authority, Glaxo SmithKline/Industrial Development Authority

Name: Dr. Aileen Lynch

Position: Lecturer in Biological Sciences

Contact details: School of Nursing and Midwifery,
24 D'Olier Street,
Trinity College Dublin
Telephone: 353-01-896-8571
Email:amlynch@tcd.ie

RESEARCH INTERESTS:

My research area is in neuroimmunology with an emphasis on the inflammatory events that occur during the ageing process. In this context, I am particularly interested in the interplay between cells of the nervous system. In vivo (aged rats) and in vitro methods are used to assess neuronal-glial interactions and glial-endothelial interactions, and to determine how the signalling and molecular mechanisms between these cell types are modified by neuroinflammation in the aged brain..

RECENT PUBLICATIONS:

Loane DJ, Deighan BF, Clarke RM, Griffin RJ, Lynch AM and Lynch MA (2009). Interleukin-4 mediates the neuroprotective effects of rosiglitazone in the aged brain. *Neurobiol. Aging*. 30: 920-931.

Minogue AM, Lynch AM, Loane DJ, Herron CE and Lynch MA. (2007). Modulation of amyloid-beta-induced and age-associated changes in rat hippocampus by eicosapentaenoic acid. *J. Neurochem.* 103: 914-926.

Lynch AM, Loane DJ, Minogue AM, Clarke RM, Kilroy D, Nally RE, Roche OJ, O'Connell F and Lynch MA (2007). Eicosapentaenoic acid confers neuroprotection in the amyloid-beta challenged aged hippocampus. *Neurobiol Aging.* 28: 845-855.

Lynch AM, Walsh C, Delaney A, Nolan Y, Campbell VA and Lynch MA (2004). Lipopolysaccharide-induced increase in signalling in hippocampus is abrogated by IL-10--a role for IL-1beta? *J. Neurochem.* 88: 635-646.

Lynch AM, Moore M, Craig S, Lonergan PE, Martin DS and Lynch MA (2003). Analysis of interleukin-1 beta-induced cell signaling activation in rat hippocampus following exposure to gamma irradiation. Protective effect of eicosapentaenoic acid. *J. Biol. Chem.* 278: 51075-51084.

Lynch AM and Lynch MA (2002). The age-related increase in IL-1 type I receptor in rat hippocampus is coupled with an increase in caspase-3 activation. *Eur. J. Neurosci.* 15: 1779-1788.

RESEARCH FUNDING:

Trinity College Dublin

Name: Prof. Marina Lynch

Position: Professor of Cellular Neuroscience

Contact details: Department of Physiology,
Trinity College Institute of Neuroscience
Trinity College Dublin
Telephone: 353-01-896-8531
Email: lynchma@tcd.ie

RESEARCH INTERESTS:

My research focuses on investigating the contribution of neuroinflammatory changes in the age-related and amyloid β-induced deterioration in synaptic function in the brain, especially in the hippocampus. A key component of neuroinflammation is activation of microglia and astrocytes and therefore a particular objective is to understand the factors which trigger activation of these cells, with the aim of modulating these changes and restoring synaptic function. Current work includes an evaluation of the role of cell-cell interaction in modulating microglial activation with a special focus on assessing the interaction between CD200 and its receptor. Among the factors which upregulates CD200 expression is the anti-inflammatory cytokine, IL-4 and recent studies have provided evidence that some novel anti-inflammatory agents attenuate age- and amyloid β-induced changes in hippocampus because they exert an effect on IL-4 and CD200 expression. My current research group consists of 6 postdoctoral fellows and 9 PhD students

RECENT PUBLICATIONS:

Downer EJ, Cowley TR, Lyons A, Mills KHG, Berezin V, Bock E and Lynch MA (2009). A novel anti-inflammatory role for NCAM-derived mimetic peptide, FGL. *Neurobiol Aging*. [Epub ahead of print].

Miller AM, Piazza A, Martin DS, Walsh M, Mandel A, Bolton AE and Lynch MA (2009). The deficit in long-term potentiation induced by chronic administration of amyloid-beta is attenuated by treatment of rats with a novel phospholipid-based drug formulation, VP025. *Exp Gerontol.* 44: 300-304.

Costelloe C, Watson M, Murphy A, McQuillan K, Loscher C, Armstrong ME, Garlanda C, Mantovani A, O'Neill LA, Mills KHG and Lynch MA (2008). IL-1F5 mediates anti-inflammatory activity in the brain through induction of IL-4 following interaction with SIGIRR/TIR8. *J Neurochem.* 105: 1960-1969.

Lynch MA (2008). The risky business of ageing. *Brain Behav Immun.* 22: 299-300.

Clarke RM, Lyons A, O'Connell F, Deighan BF, Barry CE, Anyakoha NG, Nicolaou A and Lynch MA (2007). A pivotal role for IL-4 in atorvastatin-associated neuroprotection in rat brain. *J. Biol. Chem.* 283: 1808-1817.

Minogue AM, Lynch AM, Loane DJ, Herron CE and Lynch MA (2007). Modulation of amyloid-β-induced and age-associated changes in rat hippocampus by eicosapentaenoic acid. *J. Neurochem.* 103: 914-925

Lyons A, Downer EJ, Crotty S, Nolan YM, Mills KHG and Lynch MA (2007). CD200 ligand receptor interaction modulates microglial activation in vivo and in vitro: a role for IL-4. *J Neurosci.* 27: 8309-8313

RESEARCH FUNDING:

Science Foundation Ireland, Health Research Board, Glaxo SmithKline/Industrial Development Authority, European Union, Amarin

Name: Dr. Connail McCrory

Position: Medical Director Pain Medicine,
St. James Hospital and Senior Lecturer School of Medicine,TCD.

Contact details: Phase 1 H , St. James Hospital
Email: dr.mccrory@painclinic.ie
or St. James Hospital: cmccrory@stjames.ie
Tel: 4103952 (Secretary: Anne) FAX: 4284069

RESEARCH INTERESTS:

Spinal neuronal inflammatory responses in man leading to pain perception. Effect of Spinal Cord Stimulation on Cerebrospinal Fluid cytokines in vivo in man. Investigation of Spinal Neuronal Mechanism of Chronic Pain in man by CSF analysis. Analgesic Agent Pharmacokinetics in Human Cerebrospinal Fluid and investigation of their effect on CSF cytokines.

RECENT PUBLICATIONS:

L. Brennan, B. Harte, D. Fitzgerald, C. McCrory (2009) Surgery induces spinal COX-2 expression in rats. *Regional Anesthesia & Pain Medicine* 9; 549-52

Brennan L, Fitzgerald J, McCrory C. (2009) The use of Pulsed radiofrequency treatment for chronic benign pancreatitis pain. *Pain Pract.* 9;135-40

C. McCrory, S. Allen, M. Krajnik (2007) Management strategies for Neuropathic Pain in *Europe Journal of Pain & Palliative Care Pharmacotherapy.* 21:49-52

Name: Dr. Kevin Mitchell

Position: Senior Lecturer in Genetics

Contact details: Department of Genetics,
Trinity College Dublin
Telephone: 353-01-896-3067
Email: Kevin.Mitchell@tcd.ie

RESEARCH INTERESTS:

I am interested in the the development of connectivity in the brain, specifically in how this process is controlled by genes and how mutations in such genes affect the connectivity of neuronal circuits, influence behaviour and perception and contribute to disease. My research group uses genetic approaches in the mouse to address these questions, and we are also involved in collaborative research looking at the genetics and phenotypic manifestations of synaesthesia and schizophrenia in humans. .

RECENT PUBLICATIONS:

Little GE, López-Bendito G, Rünker AE, García N, Piñon MC, Chédotal A, Molnár Z and Mitchell KJ. (2009). Specificity and plasticity of thalamocortical connections in Sema6A mutant mice. *PLoS Biol.* 7: e98.

Barnett KJ, Foxe JJ, Molholm S, Kelly SP, Shalgi S, Mitchell KJ and Newell FN (2008). Differences in early sensory-perceptual processing in synesthesia: a visual evoked potential study. *Neuroimage.* 43: 605-613.

Bargary G and Mitchell KJ (2008). Synaesthesia and cortical connectivity. *Trends Neurosci.* 31: 335-342.

Renaud J, Kerjan G, Sumita I, Zagar Y, Georget V, Kin D, Fouquet C, Suda K, Sanbo M, Suto F, Ackerman SL, Mitchell KJ, Fuilsawa H and Chédotal A (2008) Plexin-A2 and its ligand, Sema6A, control nucleus-centrosome coupling in migrating granule cells. *Nat. Neurosci.* 11: 440-449.

Mitchell KJ (2007). The genetics of brain wiring; from molecule to mind. *PLoS Biology* 5: e113

Kerjan G, Dolan J, Haumaitre C, Schneider-Maunoury S, Fujisawa H, Mitchell KJ and Chédotal A (2005). The transmembrane semaphorin Sema6A controls cerebellar granule cell migration. *Nat. Neurosci.* 8: 1516-1524.

RESEARCH FUNDING:

Science Foundation Ireland, Health Research Board, Wellcome Trust

Name:	Prof. Kingston Mills
Position:	Professsor of Experimental Immunology
Contact details:	School of Biochemistry and Immunology, Trinity College Dublin Telephone: 353-01-896-3573 Email:kingston.mills@tcd.ie

RESEARCH INTERESTS:

My research interests include innate and acquired resistance to infection; pathogen immune modulation and immunomodulatory molecules as anti-inflammatory therapeutics for autoimmunity; role of dendritic cells in driving T cell responses; immune regulation and manipulating regulatory versus effector or pathogenic T cells and its application in the development of immunotherapeutics/vaccines against cancer, autoimmunity and Alzheimer's disease

RECENT PUBLICATIONS:

Downer EJ, Cowley TR, Lyons A, Mills KHG, Berezin V, Bock E and Lynch MA (2009). A novel anti-inflammatory role for NCAM-derived mimetic peptide, FGL. *Neurobiol Aging.* [Epub ahead of print].

Mills KHG (2008). Induction, function and regulation of IL-17-producing T cells. *Eur. J. Immunol*. 38: 2636-2649.

Hickey FB, Brereton CF and Mills KHG (2008). Adenylate cycalse toxin of Bordetella pertussis inhibits TLR-induced IRF-1 and IRF-8 activation and IL-12 production and enhances IL-10 through MAPK activation in dendritic cells. *J. Leukoc. Biol.* 84: 234-243.

Jarnicki AJ, Conroy H, Brereton C, Donnelly G, Toomey D, Walsh K, Sweeney C, Leavy O, Fletcher J, Lavelle E, Dunne P and Mills KHG (2008). Attenuating regulatory T cell induction by TLR agonists through inhibition of p38 MAPK signaling in dendritic cells enhances their efficacy as vaccine adjuvants and cancer immunotherapeutics. *J. Immunol.* 180: 3797-3806.

Costelloe C, Murphy A, Armstrong M, Loscher C, Dunne E, McQuillan K, O'Neill L, Montavani A, Mills KHG and Lynch MA (2008). IL-1F5 mediates anti-inflammatory activity in the brain through induction of IL-4 following interaction with SIGIRR/TIR8. *J. Neurochem.* 105: 1960-1969.

Sutton C, Keogh B, Brereton C, Mills KHG and Lavelle EC (2006). A crucial role for IL-1 in the induction of IL-17 producing T cells that mediate autoimmune encephalomyelitis. *J. Exp. Med.* 203: 1685-1691.

RESEARCH FUNDING:

Science Foundation Ireland, Enterprise Ireland, Health Research Board, The Wellcome Trust

Name: Prof. Declan McLoughlin

Position: Research Professor of Psychiatry

Contact details: Department of Psychiatry
Trinity College Dublin
St. Patrick's Hospital
James's Street Dublin 8
Telephone: 353-01-249-3343
Email: mclougde@tcd.ie

RESEARCH INTERESTS:

Current research activities include projects on: the molecular pathogenesis of Alzheimer's disease; molecular neurobiology of depression; randomised controlled trials of therapeutic neuromodulation in severe depression and plasma biomarkers for depression, treatment response and relapse.

RECENT PUBLICATIONS:

Eranti SV, Mogg AJ, Pluck GC, Landau S, and McLoughlin DM. (2009). Methohexitone, propofol and etomidate in electroconvulsive therapy for depression: a naturalistic comparison study. *J. Affect. Disord.* 113: 165-171.

Lau KF, Chan WM, Perkinton MS, Tudor EL, Chang RC, Chan HY, McLoughlin DM, Miller CCJ. (2008). Dexras1 interacts with FE65 to regulate FE65-amyloid precursor protein-dependent transcription. *J. Biol. Chem.* 283: 34728-34737.

McLoughlin DM and Miller CCJ (2008). The FE65 proteins and Alzheimer's disease. *J. Neurosci. Res.* 86: 744-754

Manser C, Stevenson A, Banner S, Davies J, Tudor EL, Ono Y, Nigel Leigh P, McLoughlin DM, Shaw CE and Miller CCJ (2008). Deregulation of PKN1 activity disrupts neurofilament organisation and axonal transport. *FEBS Lett.* 582: 2303-2308.

Knapp M, Romeo R, Mogg A, Eranti S, Pluck G, Purvis R, Brown RG, Howard R, Philpot M, Rothwell J, Edwards D and McLoughlin DM (2008) Cost-effectiveness of transcranial magnetic stimulation vs. electroconvulsive therapy for severe depression: a multi-centre randomised controlled trial. *J. Affect. Disord.* 109: 273-285.

Mogg A, Eranti S, Pluck G, Landau S, Purvis R, Brown RG, Howard R, Philpot M and McLoughlin DM (2008). A randomised controlled trial with four-month follow-up of repetitive transcranial magnetic stimulation for depression. *Psychol. Med.* 38: 323-333.

RESEARCH FUNDING:

Health Research Board, The Wellcome Trust, Alzheimer's Society and Alzheimer's Research Trust

Name: Prof. Fiona Newell

Position: Associate Professsor of Psychology

Contact details: School of Psychology,
Trinity College Dublin
Telephone: 353-01-896-3914
Email: fiona.newell@tcd.ie

RESEARCH INTERESTS:

Our research aim is to elucidate the behavioural and cortical correlates of multisensory perception in humans for the purpose of texture, object, face and scene recognition. This research is mainly conducted with normal adult populations but also involves investigations of multisensory perception in ageing, in persons who are sensory deprived and in synaesthesia. We use standard behavioural methodologies, EEG and fMRI in our studies.

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RECENT PUBLICATIONS:

Casey SJ, Mernagh M and Newell FN. (2009). Are attractive facial characteristics peculiar to the sex of a face?. *Q. J. Exp. Psychol.* 62: 833-843.

Woods AT, Moore A and Newell FN. (2008). Canonical views in haptic object perception. *Perception 37:* 1867-1878.

Barnett KJ, Foxe JJ, Molholm S, Kelly SP, Shalgi S, Mitchell KJ and Newell FN. (2008). Differences in early sensory-perceptual processing in synesthesia: a visual evoked potential study. *Neuroimage* 43: 605-613.

Whitaker TA, Simões-Franklin C and Newell FN. (2008). Vision and touch: independent or integrated systems for the perception of texture? *Brain Res*. 1242: 59-72.

Chan JS and Newell FN. (2008). Behavioral evidence for task-dependent "what" versus "where" processing within and across modalities. *Perception & Psychophysics* 70: 36-49.

Pasqualotto A and Newell FN (2007). The role of visual experience on the representation and updating of novel haptic scenes. *Brain & Cognition.* 65: 184-194.

RESEARCH FUNDING:

Science Foundation Ireland, Health Research Board, European Union, Intel/Industrial Development Authority

Name: Prof. John O' Doherty

Position: Professor of Cognitive Neuroscience

Contact details: School of Psychology,
Trinity College Dublin
Telephone: 353-01-896-8526
Email: odoherjp@tcd.ie

RESEARCH INTERESTS:

The goal of my research is to unravel the neural computations underlying the ability to make decisions under uncertainty. A deeper understanding of "how" the brain does this will not only inspire new theories of decision making, it will also contribute to the development of genuine "artificial intelligence", and it will enable us to understand why some humans are better than others at making decisions, why humans with certain psychiatric disorders or brain lesions are less capable of doing so, and why under some circumstances humans systematically fail to make "rational" decisions. A cornerstone of our approach is the adoption of a new method known as "model-based fMRI", in which one takes a precise quantitative computational model for a particular cognitive process and applies this model to fMRI data in order to identify brain regions with response profiles consistent with a specific computational signal. This method allows one to begin to characterize how a particular cognitive function is implemented in the brain, as opposed to merely identifying where in the brain such functions are located, as is done in more traditional fMRI studies. We are now also involved in using other techniques alongside and in combination with fMRI, such as studying the effects of discrete lesions in specific brain regions on decision making behaviour, as well as using transcranial magnetic stimulation (TMS) to induce temporary lesions in healthy subjects. Other interests include the functional neuroanatomy of human emotions, neural structures involved in social cognition, and the functional neuroanatomy of the gustatory system.

RECENT PUBLICATIONS:

Hampton AN, Bossaerts P and O'Doherty JP (2008). Neural correlates of mentalizing-related computations during strategic interactions in humans. *Proc. Natl. Acad. Sci. US A.* 105: 6741-6746.

Bray S, Rangel A, Shimojo S, Balleine B and O'Doherty JP (2008). The neural mechanisms underlying the influence of pavlovian cues on human decision making. *J. Neurosci.* 28: 5861-5866.

Hampton AN, Adolphs R, Tyszka MJ and O'Doherty JP (2007). Contributions of the amygdala to reward expectancy and choice signals in human prefrontal cortex. *Neuron* 55: 545-55.

Daw N*, O'Doherty JP*, Dayan P, Seymour B and Dolan RJ (2006). Cortical substrates for exploratory decisions in humans. *Nature.* 441: 876-879. [*joint first authors].

O'Doherty J, Dayan P, Schultz J, Deichmann R, Friston K and Dolan RJ (2004). Dissociable roles of ventral and dorsal striatum in instrumental conditioning. *Science*. 304: 452-454.

RESEARCH FUNDING:

Dana Foundation, National Institute of Mental Health, National Science Foundation (USA), Kinship Searle Foundation Scholarship, Gordon and Betty Moore Foundation, Science Foundation Ireland

Name: Prof. Shane O'Mara

Position: Professsor of Experimental Brain Research

Contact details: Trinity College Institute for Neuroscience
Trinity College Dublin
Telephone: 353-01-896-8447
Email: smomara@tcd.ie

RESEARCH INTERESTS:

I investigate the relations between synaptic plasticity (the mechanisms by which the brain changes as a result of experience), cognition (the abstract psychological processes by which we know, represent and understand the external world), and changes in learned behaviour. I have concentrated my research on two particular and inter-related areas: 1. the neurobiology and neuropsychology of learning and memory, and 2. the neurobiology and neuropsychology of stress and depression. These two seemingly diverse areas overlap to a very considerable degree. The synaptic plasticity that allows for memories to be encoded is disordered to a very considerable degree in depression, and treatments reducing the effects of depression (exercise, drugs, social interaction) enhance synaptic plasticity and hence memory function. In turn, these treatments also form the basis of therapy for age-related decline in memory and cognitive function. We use a combination of in vivo multi-electrode neurophysiology, behavioural analysis, molecular biology and pharmacological intervention to investigate the function of brain systems implicated in memory function and dysfunction and in psychiatric disease (particularly major depressive disorder).

RECENT PUBLICATIONS:

O'Mara SM, Sanchez-Vives MV, Brotons-Mas JR and O'Hare E (2009). Roles for the subiculum in spatial information processing, memory, motivation and the temporal control of behaviour. *Prog. Neuropsychopharmacol. Biol. Psychiatry.* [Epub ahead of print].

Fahey B, Barlow S, Day JS and O'Mara SM (2008). Interferon-alpha-induced deficits in novel object recognition are rescued by chronic exercise. *Physiol. Behav.* 95: 125-129.

Tsanov M, Brotons J, Sanchez-Vives MV and O'Mara SM (2008). Synaptic plasticity and mnemonic encoding by hippocampal formation place cells. In: TF Kaiser and FJ Peters (Eds.), *Synaptic Plasticity: New Research. Nova: New York*. pp 309-344.

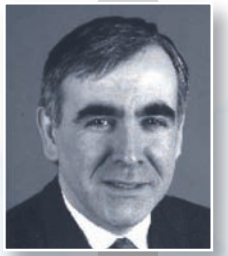
Cowley TR, Fahey B and O'Mara SM (2008). Prostaglandin E2 production by COX-2, but not COX-1, activity is necessary for the induction of perforant path long-term potentiation and spatial learning in vivo. *Eur. J. Neurosci.* 27: 2999-3008.

Fahey B, Hickey B, Kelleher D, O'Dwyer AM, and O'Mara SM (2007). The Widely-Used Anti-Viral Drug Interferon-alpha Induces Depressive- and Anxiogenic-like Effects in Healthy Rats. *Behav. Brain Res.* 182: 80–87.

O'Mara SM (2006). Controlling Hippocampal Output: The Central Role Of Subiculum In Hippocampal Information Processing. *Behav. Brain Res.* 174: 304-312.

RESEARCH FUNDING:

Glaxo SmithKline / Industrial Development Authority Science Foundation Ireland, The Wellcome Trust, Health Research Board



Name:	Prof. Desmond O'Neill
Position:	Associate Professsor of Gerontology
Contact details:	Department of Clinical Medicine, Trinity College Dublin Telephone: 353-01-414-3215 Email: des.oneill@tcd.ie

RESEARCH INTERESTS:

Professor Desmond O'Neill's work on Neurosciences and Ageing focuses on stroke, in particular recovery following stroke as well as prediction of fitness to drive following stroke and dementia. Current studies involve assessment of the effects of prism adaptation opostural stability following stroke and the use of assistive robotic devices in guided rehabilitation in hemiplegia, models of adaptation after stroke and factors affecting higher order complex functions such as driving: identifying behavioural and cognitive factors which underlie preserved driving skills in neurodegenerative disease is one major focus. The Medical Gerontology Department at Tallaght Hospital runs the only comprehensive driving screening project in the Republic of Ireland and potential research projects include modelling both behavioural and neurocognitive factors determining preserved driving abilities in degenerative disease. Areas of interest include the characterization of oesophageal motility after stroke and determinants of successful recovery after stroke.

RECENT PUBLICATIONS:

Crawford VL, Dinsmore JG, Stout RW, Donnellan C, O'Neill D and McGee H. (2009). Stroke Presentation and Hospital Management. Comparison of Neighboring Healthcare Systems With Differing Health Policies. *Stroke*. [Epub ahead of Print].

Martin AJ, Marottoli R and O'Neill D. (2009). Driving assessment for maintaining mobility and safety in drivers with dementia. *Cochrane Database Syst Rev.*, CD006222.

McGee H, O'Hanlon A, Barker M, Hickey A, Montgomery A, Conroy R and O'Neill D (2008). Vulnerable older people in the community: relationship between the Vulnerable Elders Scale and health service use. *J. Am. Geriatr. Soc.* 56: 8-15.

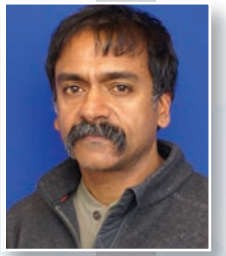
Langford J, Braitman K, Charlton J, Eberhard J, O'Neill D, Staplin L and Stutts J (2008). TRB Workshop 2007: Licensing authorities' options for managing older driver safety--practical advice from the researchers. *Traffic Inj. Prev.* 9: 278-281

O'Dwyer C and O'Neill D (2008). Developing Strategies for the Prevention, Detection and Management of Elder Abuse: the Irish Experience. *J. Elder Abuse Negl*. 20: 169-180.

Quinlan N and O'Neill D (2008). "Older" or "elderly"--are medical journals sensitive to the wishes of older people?. *J. Am. Geriatr. Soc.* 56: 1983-1984.

RESEARCH FUNDING:

Health Research Board, Department of Health and Children, Irish Heart Foundation



Name: Prof. Mani Ramaswami

Position: Reearch Professsor of Neuroscience

Contact details: Department of Genetics,
Trinity College Dublin
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RESEARCH INTERESTS:

My research is in genetic, molecular, cellular and behavioral neuroscience. I am interested in linking molecular and circuit mechanisms of simple learned behaviors. We work in primarily in the genetic model organism Drosophila melanogaster studying synaptic mechanisms, miRNA mediated translational control in neurons, and mechanisms of simple memory. An obvious extension of these studies to to ask how these mechanisms are affected in disease and we currently study disease models for fragile-X mental retardation and spinocerebellar ataxia. A wide range of collaborations, particularly with top research groups in Biosciences in India, expands our work into other fields including natural products, peptide neurotoxins and stem cell biology. My research group comprises 6 post-doctoral researchers and 4 postgraduate students. They use a number of in vivo approaches including Drosophila behavior, electrophysiology, optical and electron microscopy and a range of biochemical & molecular techniques.

RECENT PUBLICATIONS:

Chiang A, Priya R, Ramaswami M, Vijayraghavan K and Rodrigues V (2009). Neuronal activity and Wnt signaling act through Gsk3β to regulate axonal integrity in mature Drosophila olfactory sensory neurons. *Development*.136:1273-1282.

Kumar V, Fricke R, Bhar D, Reddy-Alla S, Krishnan KS, Bogdan S and Ramaswami M (2009). Syndapin promotes formation of a postsynaptic membrane system in Drosophila. *Mol. Biol.* Cell. 20: 2254-2264.

Kim SM, Kumar V, Lin YQ, Karunanithi S and Ramaswami M (2009). Fos and Jun potentiate individual release sites and mobilize the reserve synaptic vesicle pool at the Drosophila larval motor synapse. *Proc. Natl. Acad. Sci. U S A.* 106: 4000-4005.

Kumar V, Alla SR, Krishnan KS, Ramaswami M (2009). Syndapin is dispensable for synaptic vesicle endocytosis at the Drosophila larval neuromuscular junction. *Mol. Cell Neurosci.* 40: 234-241.

Beckham C, Hilleker A, Cziko AM, Noueiry A, Ramaswami M and Parker R (2008). The DEAD-Box RNA helicase Ded1p affects and accumulates in yeast P-bodies. *Mol. Biol. Cell.* 9: 984-993.

Wu CF and Ramaswami M (2007). The Origins of Neurogenetics. *J. Neurogenet.* 21: 165-167.

RESEARCH FUNDING:

Science Foundation Ireland, Wellcome Trust, Department of Biotechnology (India)

Name: Prof. Richard Reilly

Position: Professsor in Neural Engineering

Contact details: School of Medicine,
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Trinity College Dublin
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RESEARCH INTERESTS:

Biomedical engineering with a particular focus on particularly neural engineering and multimodal signal processing, both at a theoretical and applied level. The principal research areas include; neural engineering focusing on modelling of human multisensory integration process and the human visual attention system using high density electrophysiological analysis, Diffusion Tensor Imaging, Deep Brain Stimulatin and multimodal fusion (EEG, ECG, EMG, EGG and EOG) for neurological diagnosis. This neural engineering research is targeted at better understanding of the underlying physiology, identifying non-invasive electrophysical cognitive biomarkers for cognitive ageing, schizophrenia, depression and the detection of seizure in neonatal infants. The Neural Engineering group comprises 4 post-doctoral researchers and 7 postgraduate students.

RECENT PUBLICATIONS:

Moran RJ, Stephan KE, Kiebel SJ, Rombach N, O'Connor WT, Murphy KJ, Reilly RB and Friston KJ (2008). Bayesian estimation of synaptic physiology from the spectral responses of neural masses. *Neuroimage.* 42: 272-284.

Moran R, Molholm S, Reilly RB and Foxe JJ (2008). Nonlinear analysis of audiovisual multisensory integration based on human intracranial recordings. *Eur. J. Neurosci.* 27: 2303-2312.

Greene BR, Boylan G, Reilly RB, de Chazal P and Connolly S (2007). Combination of EEG and ECG for improved Neonatal Seizure Detection. *Clin. Neurophysiol.* 118: 1348-1359.

Lalor EC, Kelly SP, Pearlmutter BA, Reilly RB and Foxe JJ (2007). Isolating endogenous visuo-spatial attentional effects using the novel visual-evoked spread spectrum analysis (VESPA) technique. *Eur. J. Neurosci.* 26: 3536-3542.

Lalor EC, Yeap S, Reilly RB, Pearlmutter BA and Foxe JJ (2008). Dissecting the cellular contributions to early visual sensory processing deficits in schizophrenia using the VESPA evoked response. *Schizophrenia Res.* 98: 256-264.

Moran R, Kiebel SJ, Stephan KE, Reilly RB, Daunizeau J and Friston KJ (2007). A Neural Mass Model of spectral responses in electrophysiology. *NeuroImage.* 37: 706-720.

RESEARCH FUNDING:

Enterprise Ireland, Irish Council for Science, Engineering and Technology, Higher Eductaion Authority.

Name: Prof. Ian Robertson

Position: Professor of Psychology

Contact details: Institute of Neuroscience
Trinity College Dublin
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RESEARCH INTERESTS:

I and my group study attention, in particular vigilant and spatial attention, and its relationship to awareness and insight; we study these in people with traumatic brain injury, the dementias, normal ageing, schizophrenia, attention deficit hyperactivity disorder, autism and other conditions using EEG, fMRI and behavioural methods. We also work on trying to enhance brain function in the impaired and normal human brain. I am one of the PI's on a major programme of research with Intel on developing new technologies for maintaining cognitive and other independence in the elderly (http://www.trilcentre.org). Finally, we research the linkage between particular cognitive functions and underlying genotypes in normal and clinical populations.

RECENT PUBLICATIONS:

Greene CM, Bellgrove MA, Gill M, Robertson IH (2009). Noradrenergic genotype predicts lapses in sustained attention. *Neuropsychologia.* 47: 591-594.

O'Connell RG, Dockree PM, Bellgrove MA, Turin A, Ward S, Foxe JJ, Robertson IH (2009). Two types of action error: electrophysiological evidence for separable inhibitory and sustained attention neural mechanisms producing error on go/no-go tasks. *J. Cogn. Neurosci.* 21: 93-104.

O'Connell RG, Bellgrove MA, Dockree PM, Lau A, Hester R, Garavan H, Fitzgerald M, Foxe JJ and Robertson IH (2009). The neural correlates of deficient error awareness in attention-deficit hyperactivity disorder (ADHD). Neuropsychologia. 47: 1149-1159.

O'Connell RG, Bellgrove MA, Dockree PM, Lau A, Fitzgerald M and Robertson IH (2008). Self-Alert Training: Volitional Modulation of Autonomic Arousal Improves Sustained Attention. *Neuropsychologia.* 46: 1379-1390.

Bellgrove MA, Chambers CD, Johnson KA, Daibhis A, Daly M, Hawi Z, Lambert D, Gill M and Robertson IH (2007). Dopaminergic genotype biases spatial attention in healthy children. *Mol. Psychiatry.* 12: 786-792.

O'Keeffe F, Murray B, Coen RF, Dockree P, Bellgrove M, Garavan H, Lynch T and Robertson IH (2007). Loss of Insight in Frontotemporal Dementia. Corticobasal Degeneration and Progressive Supranuclear Palsy. *Brain*. 130: 753-764

RESEARCH FUNDING:

Science Foundation Ireland, Health Research Board, Intel/Industrial Development Authority, Glaxo SmithKline/Industrial Development Authority, Irish Research Council for the Humanities and Social Sciences, European Science Foundation, Irish Research Council for Science, Engineering and Technology.

Name: Prof. Michael Rowan

Position: Professsor of Neuropharmacology

Contact details: Pharmacology and Therapeutics,
Biotechnology Building
Trinity College Dublin
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Email: mrowan@tcd.ie

RESEARCH INTERESTS:

My research addresses the questions: What mechanisms underlie the different forms of synaptic plasticity in the hippocampus, in particular long-term potentiation (LTP), long-term depression (LTD) and their reversal? Which forms of synaptic plasticity are behaviourally relevant and how are they regulated by extra-hippocampal inputs? How does inescapable behavioural stress affect synaptic plasticity? How do misfolded proteins affect synaptic plasticity, in particular the Alzheimer's disease-related amyloid ß protein (Aß)? Recent research achievements include: (a) the discovery of the potent effects on LTP of different species of amyloid ß protein, especially low-n oligomers, (b) the discovery of the role of dopaminergic transmission in attentional control of LTP induction. Current research also investigates metabotropic glutamate, cholinergic, estrogen and serotonergic receptors and their down-stream signalling mediators in synaptic plasticity.

RECENT PUBLICATIONS:

Hu NW, Smith IM, Walsh DM and Rowan MJ (2008). Soluble amyloid-beta peptides potently disrupt hippocampal synaptic plasticity in the absence of cerebrovascular dysfunction in vivo. *Brain* 131: 2414-2424.

Shankar GM, Li S, Mehta TH, Garcia-Munoz A, Shepardson NE, Smith I, Brett FM, Farrell MA, Rowan MJ, Lemere CA, Regan CM, Walsh DM, Sabatini BL and Selkoe DJ. (2008). Amyloid-beta protein dimers isolated directly from Alzheimer's brains impair synaptic plasticity and memory. *Nat. Med.* 14: 837-842.

Klyubin I, Betts V, Welzel AT, Blennow K, Zetterberg H, Wallin A, Lemere CA, Cullen WK, Peng Y, Wisniewski T, Selkoe DJ, Anwyl R, Walsh DM and Rowan MJ (2008). Amyloid beta protein dimer-containing human CSF disrupts synaptic plasticity: prevention by systemic passive immunization. *J. Neurosci.* 28: 4231-4237

Walsh DM, IKlyubin I, Fadeeva JV, Cullen WK, Anwyl R, Wolfe MS, Rowan MJ and Selkoe, DJ (2002). Naturally secreted oligomers of amyloid ß protein potently inhibit hippocampal long-term potentiation in vivo. *Nature* 416: 535-539.

Kim JH, Anwyl R, Suh YH, Djamgoz MB and Rowan MJ (2001). Use-dependent effects of amyloidogenic fragments of ß-amyloid precursor protein on synaptic plasticity in rat hippocampus in vivo. *J. Neurosci.* 21: 1327-1333.

Xu L, Anwyl R and Rowan MJ (1998). Spatial exploration induces a persistent reversal of long-term potentiation in rat hippocampus. *Nature*. 394: 891-894.

RESEARCH FUNDING:

Science Foundation Ireland, Enterprise Ireland, European Union Framework 6, Industrial partnerships.

Name: Dr Daniela Tropea

Position: Lecturer in Functional Genomicsy

Contact details: Department of Psychiatry
School of Medicine
Trinity Center for Health Sciences
St James hospital
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RESEARCH INTERESTS:

I study the biological function of susceptibility genes for neurodevelopmental disorders. These genes can be studied *in vitro* and *in vivo* using transgenic animals. These models play a critical role in understanding the neurobiology of neurodevelopmetal disorders, and therefore improving diagnostic tools and exploring new treatments.

RECENT PUBLICATIONS:

Tropea D, Majewska A, Garcia R, Sur M (2010) Structural dynamics of synapses in vivo correlate with functional changes during experience-dependent plasticity in visual cortex. *Journal of Neuroscience*, in press

McCurry CL, Shepherd JD, Tropea D, Wang KH, Bear MF, Sur M (2010) Loss of Arc renders the visual cortex impervious to the effects of sensory experience or deprivation *Nat. Neurosci.* Apr;13(4):450-7

D. Tropea, E. Giacometti, N. Wilson, Caroline Beard, Cortina McCurry,Dong Dong Fu, Ruth Flannery, R. Jaenisch and M. Sur (2009) Partial reversal of Rett Syndrome-like symptoms in MeCP2 mutant mice. *PNAS*, 106 (6), 2029-2034.

M. Caleo, D. Tropea, C. Rossi, L. Gianfranceschi and L. Maffei (2009) Environmental enrichment promotes fiber sprouting after deafferentation of the superior colliculus in the adult rat brain. *Exp. Neurol.,* Apr 216 (2) 515-9.

D. Tropea, A. Van Wart and M Sur (2008). Review. Molecular mechanisms of experience-dependent plasticity in visual cortex. *Philos .Trans.* R. Soc. Lond B Biol Sci.

Lyckman, S. Horng, C. Leamey, D. Tropea, A. Watakabe, A. Van Wart, C. McCurry, T. Yamamori and M. Sur (2008). Transcriptional regulation during the critical period of ocular dominance plasticity: prominent expression of actin-binding and myelination factors. *PNAS,* 105 (27), 9409-9414.

D. Tropea, G. Kreiman, A. Lyckman, S. Mukherjee, H. Yu, S. Horng and M. Sur (2006). Gene expression changes and molecular, *Nature Neuroscience,* 9(5), 660-668.

RESEARCH FUNDING:

International Reintegration Grant (IRG), Marie Curie Actions

Name:	Dr. Daniel Ulrich
Position:	Lecturer in Neuroscience
Contact details:	Department of Physiology, Trinity College Dublin Telephone: 353-01-896-8569 Email: ulrichd@tcd.ieie

RESEARCH INTERESTS:

My research focuses on the mechanisms and function of thalamocortical rhythms. There is accumulating evidence that particular types of brain rhythms are involved in the decoding of sensory information and the formation of memory. Individual nerve cells are endowed with intrinsic electrical properties that allow them to transform synaptic input into action potential output. We are studying the response properties of different cell types to oscillatory input to elucidate their potential role as pacemakers/resonators. Synaptic connections between neurons have complex dynamic properties that are influencing the functional coupling between cells. We are studying the pharmacology and dynamical properties of different synaptic connections to understand the functional coupling between cells. How do different discharge patterns affect synaptic plasticity? We are assessing the influence of in vivo like discharge patterns on the strength of synaptic connections. We are also investigating the influence of changes at individual synapses on the behaviour of network activity. Ultimately, our goal is to elucidate the basic principles of brain functions and to contribute to a better understanding of pathological processes such as absence epilepsy, sleep disorders, pain sensation, and memory impairment.

RECENT PUBLICATIONS:

Ulrich D, Besseyrias V and Bettler B (2007). Functional mapping of GABAB receptor subtypes in the thalamus. *J.Neurophysiol.* 98: 3791-3795.

Czarnecki A, Birtoli B and Ulrich D (2007). Cellular mechanisms of burst-firing mediated long-term depression in rat neocortical pyramidal cells. *J.Physiol.* 578: 471-479.

Ulrich, D and Bettler B (2007). GABA-B receptors-synaptic functions and mechanisms of diversity. *Curr.Opin.Neurobiol.* 17: 298-303.
Rosanova M and Ulrich D (2005). Pattern-specific associative long-term potentiation induced by a sleep spindle-related spike train. *J.Neurosci.* 25: 9398-9405.

Birtoli B and Ulrich D (2004). Firing mode-dependent synaptic plasticity in rat neocortical pyramidal neurons. *J.Neurosci.* 24: 4935-4940.

Gentet LJ and Ulrich D (2004). Electrophysiological characterization of synaptic connections between layer VI cortical cells and neurons of the neucleus reticularis thalami in juvenile rats. *Eur.J.Neurosci.* 19: 625-633.

RESEARCH FUNDING:

Health Research Board, Higher Education Authority

Name:	Dr Alice Witney
Position:	Lecturer of Physiology
Contact details:	Department of Physiology School of Medicine Trinity College Dublin Telephone: 353-01-896-1019 Email: awitney@tcd.ie

RESEARCH INTERESTS:

My research uses experimental approaches to understand the control of movement and how sensory input influences motor output. I am interested in the control of the human hand, and how we are able to skillfully manipulate objects. I am also interested in whole body postural control; studying both unaffected and patient populations. My work has also addressed the impact of motor dysfunction on patients through the concept of 'health utility'.
Current focus uses insect model systems to understand sensory motor control. I film insects using high-speed videography, sometimes combined with muscle recordings, during controlled behavioural tasks. My long term aim is to make use of the better understood nervous system of insects, through combined electrophysiology and behavioural studies, as these model systems have the potential to provide a more complete way of examining theoretical models of sensory-motor integration and how they may be implemented at a neural level.

RECENT PUBLICATIONS:

Witney, A.G. and Wolpert, D.M. (2007) The effect of external loading on prediction in object manipulation. *Neuroscience Letters.* Vol. 414, pp 10-15

Witney, A.G., Treharne, G.J., Tavakoli, M., Lyons, A.C., Vincent, K., Scott, D.L, Kitas, G.D. The Influence of Demographic, Medical and Psychosocial Factors on Health Utility Measures in Rheumatoid Arthritis. (2006) *Rheumatology,* 45(8) pp 975-981.

Witney, A.G. (2004) Internal models for bi-manual tasks. *Human Movement Sciences.* Vol. 23 (5), pp 747-770.

Witney, A.G., Wing, A.M., Thonnard, J-L., Smith, A.M. (2004) The cutaneous contribution to adaptive precision grasping. *Trends in Neurosciences.* Vol 27 (10), pp 637-643

RESEARCH FUNDING:

Wellcome Trust

CONTACT

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www.tcd.ie/Neuroscience