

Sanjay Manohar MA MRCP PhD

PERSONAL DETAILS

Name	<u>Sanjay</u> George MANOHAR	Nationality:	British
Date of Birth:	*/*/79	NI Number:	*
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QUALIFICATIONS

2017	Associate Fellow of the HEA (teaching)	Higher Education Academy
2015	PhD (Cognitive Neurology)	UCL
2006	MRCP (UK)	Royal College of Physicians
2004	Master of Arts	Gonville & Caius College, Cambridge University (<i>Academic Scholarship</i>)
2003	MB, BChir	
2000	BA Hons. Physiology & Psychology (2:1)	
1999	Medical Sciences Tripos (1st class)	

EMPLOYMENT

Current Positions

Feb 2017 –	MRC Clinician Scientist Fellowship	Nuffield Department of Clinical Neurosciences, Oxford
Sep 2017 –	Associate Professor	University of Oxford
Aug 2014 –	Honorary Consultant Neurologist	John Radcliffe Hospital
Sep 2015 –	Junior Research Fellow	Lady Margaret Hall, Oxford
Apr 2017 –	Honorary Senior Research Associate	UCL

Previous Employment

May 14 – Feb 16	Clinical Research Fellow	Department of Experimental Psychology, University of Oxford
Aug 07 – May 14	Specialist Registrar in Neurology	Imperial College NHS Trust
May 10 – Aug 13	Wellcome Trust Clinical Research Training Fellowship	Institute of Cognitive Neuroscience, Queen Square, UCL
Feb 07 – May 10	Academic Clinical Fellowship	Cognitive Neurology, Imperial College, London
Feb 06 – Dec 06	SHO Medical rotation	Hammersmith Hospital
Aug 05 – Feb 06	SHO Intensive Care	Kings College Hospital
Feb 05 – Aug 05	SHO Nephrology	Addenbrooke's Hospital
Aug 04 – Feb 05	SHO Neurology	National Hospital for Neurology
Feb 04 – Aug 04	SHO Casualty	Queen Elizabeth Hospital, London
Feb 03 – Feb 04	Pre-registration House Officer	West Suffolk Hospital

AWARDS

Postgraduate

2017	MRC Clinician Scientist Fellowship (£1,291,319)
2017	Fellowship of the Software Sustainability Institute (RCUK, £3000)
2015	Junior Research Fellowship at Lady Margaret Hall, Oxford (3 years, £15,000)
2015	University Staff Innovation Seed Fund award (£18,769)
2013	UCL Queen Square Symposium Prize
2013	Oxford Learning Institute Teaching Award
2013	Oxford University OxTALENT Prize for innovation (2 prizes)
2012	Guarantors of Brain Travel Grant (£1000)
2010	Wellcome Trust Clinical Fellowship (awarded £231,790)
2007	NIHR Academic Clinical Fellowship (3 years, value £30,750)

University

1998	Academic Scholarship at Gonville and Caius College
1999	Academic Scholarship at Gonville and Caius College
1997–2000	Choral Scholarship at Gonville & Caius College
2000	Sir Rudolph Peters Prize

PUBLICATIONS

1. Ang YS*, **Manohar SG***, Plant O, Kienast A, LeHeron C, Muhammed K, Husain M, “Dopamine modulates option generation for behavior”, *Current Biology* (2018) [**Joint first author**]
2. Le Heron C, Plant O, **Manohar SG**, Ang YS, Jackson M, Lennox G, Hu MT, Husain M, “Distinct effects of apathy and dopamine on effort-based decision-making in Parkinson’s disease”, *Brain* 141:5:1455 (2018)
3. Fallon SJ, Mattiesing RM, Dolfen N, **Manohar S**, Husain M, “Ignoring versus updating in working memory reveal differential roles of attention and feature binding”, *Cortex* (2018)
4. Moradi ZZ, **Manohar SG**, Duta M, Enock F and Humphreys GW, “In-group biases and oculomotor responses: beyond simple approach motivation”, *Exp Brain Res* doi:10.1007/s00221-018-5221-7 (2018)
5. **Manohar SG**, Zokaei N, Fallon SJ, Vogels TP, Husain M, “A neural model of working memory”, *BioRxiv* (2017)
6. **Manohar SG**, Finzi RD, Drew D, Husain M, “Distinct motivational effects of contingent and non-contingent rewards”, *Psychological Science* (2017)
7. Fallon SJ, Mattiesing RM, Muhammed K, **Manohar S**, Husain M, “Fractionating the Neurocognitive Mechanisms Underlying Working Memory: Independent Effects of Dopamine and Parkinson’s Disease”, *Cerebral Cortex* 27:12 (2017)
8. Nachev P, Rose GE, Verity DH, **Manohar SG**, MacKenzie K, Adams G, Theodorou M, Pankhurst Q, Kennard C, Magnetic oculomotor prosthetics for acquired nystagmus, *Ophthalmology* 124:10:1556 (2017)
9. **Manohar SG**, Pertzov Y, Husain M, “Short-term memory for spatial, sequential and duration information”, *Curr Op Beh Neurosci* 17:20 (2017)

10. **Manohar SG**, Akam T, “Cortical areas needed for choosing actions based on desires (Commentary)”, *Brain* 140:6:1539-42 (2017)
11. Sadnicka A, Daum C, Cordivari C, Bhatia KP, Rothwell JC, **Manohar SG**, Edwards MJ, “Mind the gap: temporal discrimination and dystonia” *Eur J Neurol* (2017) [**Joint senior author**]
12. Koyluoglu OO, Pertzov Y, **Manohar S**, Husain M, Fiete I, “Fundamental bound on the persistence and capacity of short term memory as stored as graded persistent activity”, *eLife* 6:e22225 (2017)
13. Pertzov Y, **Manohar SG**, Husain M, “Rapid forgetting results from competition over time between items in visual working memory”, *J Exp Psychol: Learn Mem Cogn* 43:4:528 (2017)
14. Muhammed K, **Manohar SG**, Yehuda MB, Chong TTJ, Tofaris G, Lennox G, Bogdanovic M, Hu M, Husain M, “Reward sensitivity deficits modulated by dopamine are associated with apathy in Parkinson’s disease”, *Brain* (2016)
15. Fallon SJ., Zokaei N., Norbury A., **Manohar SG.**, Husain M., “Dopamine alters the fidelity of working memory representations according to attentional demands”, *J Cogn Neurosci* (2016)
16. **Manohar SG**, Husain M, “Lesions to human medial prefrontal cortex alter incentivisation by reward” *Cortex* 76:104 (2016) doi:10.1016/j.cortex.2016.01.005
17. **Manohar SG**, Husain M, “Reduced pupillary reward sensitivity in Parkinson's disease” *Nature Partner Journals Parkinson's Disease* 1:15026 (2016) doi:10.1038/npjparkd.2015.26
18. **Manohar SG.**, Husain M., “Working memory for sequences of temporal durations reveals a volatile single-item store”, *Frontiers in Psychology* 7 (2016) doi:10.3389/fpsyg.2016.01655
19. Pertzov Y, **Manohar S**, Husain M, “Rapid forgetting results from competition over time between items in working memory”, *J Exp Psychol: Learn Mem Cogn* (2016)
20. **Manohar SG**, Chong TJ, Apps MA, Batla A, Stamelou M, Jarman P, Bhatia KP, Husain M, “Reward pays the cost of noise reduction in motor and cognitive control”, *Current Biology* 25(13):1707-16 (2015) doi:10.1016/j.cub.2015.05.038
21. Chong T, Bonnelle V, **Manohar S**, Veromann K, Muhammed K, Tofaris G, Hu M, Husain M, “Dopamine enhances willingness to exert effort for reward in Parkinson's disease”, *Cortex* 69:40 (2015)
22. Bonnelle V, **Manohar S**, Behrens T, Husain M, “Individual differences in premotor brain systems underlie behavioral apathy”, *Cerebral Cortex* (2015) doi:10.1093/cercor/bhv247
23. Apps MA, Grima LL, **Manohar S**, Husain M, “The role of cognitive effort in subjective reward devaluation and risky decision-making”, *Scientific Reports* 5:16550 (2015)
24. Joseph S, Iverson P, **Manohar S**, Fox Z, Scott SK, Husain M, “Precision of working memory for speech sounds”, *Quart. J. Exp. Psychol.* 68:10 (2015)
25. Hayward C, Patel HC, **Manohar SG**, Lyon AR, “Gene therapy for GM1 gangliosidosis: challenges of translational medicine”, *Annals of translational medicine* 3:S1 (2015)
26. Zokaei N, Ning S, **Manohar S**, Feredoes E, Husain M, Flexibility of representational states in working memory, *Frontiers in Human Neuroscience* 8 (2014) 10.3389/fnhum.2014.00853

27. Bonnelle V, Veromann K, Burnett S, Lo Sterzo E, **Manohar S**, Husain M, “Characterisation of reward and effort mechanisms of apathy”, *J Physiol. Paris* (2014)
doi:10.1016/j.jphysparis.2014.04.002
28. **Manohar S**, Husain M, “Attention as foraging for information and reward” *Frontiers in Human Neuroscience* 7:711 (2013), doi:10.3389/fnhum.2013.00711
29. Zokaei N, **Manohar S**, Husain M, Feredoes E, “Causal evidence for a privileged working memory state in early visual cortex” *J Neurosci* 34(1):158-162 (2013),
doi:10.1523/jneurosci.2899-13.2013
30. Norbury A, **Manohar S**, Rogers RD, Husain M, “Dopamine modulates risk-taking as a function of baseline sensation-seeking trait” *J Neurosci* 33(32):12982-12986 (2013),
doi:10.1523/jneurosci.5587-12.2013
31. Camara E, **Manohar S**, Husain M, “Past rewards capture spatial attention and action choices” *Experimental Brain Research* 230(3):291-300, (2013), doi:10.1007/s00221-013-3654-6
32. **Manohar S**, Bonnelle V, Husain M, “Neurological disorders of attention” in *The Oxford Handbook of Attention*, 1028-1061, Eds. Nobre & Kastner, OUP (2013)
33. Sinha N, **Manohar S**, Husain M, “Impulsivity and apathy in Parkinson's disease” *Journal of Neuropsychology* 7(2):255-283 (2013), doi:10.1111/jnp.12013
34. Adam R, **Manohar S**, “Does reward modulate actions or bias attention?” *J Neurosci* 27(41):10919-10921 (2007), doi:10.1523/jneurosci.2957-07.2007
35. Hubbard EM, **Manohar SG**, & Ramachandran VS, “Contrast affects the strength of synesthetic colors” *Cortex* 42(2):184-94 (2006), doi:10.1016/S0010-9452(08)70343-5
36. Walsh SR, Thomas C, **Manohar S**, Coveney EC, “Early management of atrial fibrillation in general surgical in-patients” *Int J Surg.* 4:115-117 (2006).

PRESENTATIONS

2018	Guest speaker	“Motivation in neurological disease”, Imperial College Neurology Grand Round
2017	Invited speaker	“ <i>Motivation and the energization of movement</i> ” Gordon Conference on Eye Movements (Canada)
2017	Invited speaker	“ <i>Apathy in Neurological Disease</i> ” British Neuropsychiatry Association meeting (London)
2016	Guest speaker	Institute of Cognitive Neuroscience, UCL (London)
2015	Guest speaker	“ <i>Neuropsychological mechanisms of motivation by reward</i> ” Imperial College Brain Meeting
2015	Selected Talk	“ <i>Effects of frontostriatal disorders on reward sensitivity</i> ” Joint Meeting of the British Neuropsychological Society Nederlandse Vereniging voor Neuropsychologie
2013	Selected Talk (chosen out of 50 abstracts):	“ <i>Loss of reward modulation of vigour in patients with Parkinson's disease,</i> ” Oxford Parkinson's Disease Research Day UK
2013	Poster (prizewinner out of 66 posters)	“ <i>Dopamine increases distraction dependent upon reward,</i> ” Queen Square Symposium, London UK

OTHER QUALIFICATIONS AND APPOINTMENTS

- May 2017 - **Honorary Research Fellow** UCL Institute of Neurology.
- 2016 **USMLE** Medical licensing exams for USA.
- 2016 **British Psychological Society** accreditation
- 2014 Certificate of Completion of Specialist Training (CCST) in Neurology
- 2010-2013 **PhD / Clinical Research Fellowship** at Institute of Cognitive Neuroscience, UCL. *“Frontostriatal contributions to reward processing”* Supervisors: Prof. M. Husain; Prof. Steve Kennerley. Examiners: Prof. Emrah Duzel, Prof. Matthew Rushworth. I studied the effects of dopamine deficits, dopamine supplementation, and prefrontal cortex damage on motivation. By recording eye movements, pupil diameter, and choice, I found that dopamine levels govern reward-sensitivity in decision-making, and quantified how this evolves during a decision period. Pharmacological manipulations in healthy volunteers, patients with Parkinson’s disease, and strokes affecting focal areas of prefrontal cortex allowed me to test hypotheses about how neurotransmitters in the frontal lobe might encode the weighing up of options.
- 2007-2009 **Honorary Research Fellow** at Division of Neurosciences and Mental Health, Imperial College.
- 2005 **Sun Certified Java Programmer** – software developer qualification
- Sept 2004 **Honorary Researcher** at Institute of Cognitive Neurosciences, Queen Square. Supervisor: Prof. Jon Driver, UCL

TEACHING EXPERIENCE

- 2018 **Good Coding Practice Tutorials** for the British Neuroscience Association special interest group in Neuroinformatics.
- 2018 **Devised lecture course** in cognitive neurology, Dept of Psychology, University of Oxford (8 lectures, 6 tutorials, 2 exam papers)
- 2017 **Developing Learning and Teaching** portfolio of teaching work leading to HEA-approved qualification.
- 2015 – 18 **Undergraduate tutor** for medicine and psychology at Lady Margaret Hall.
- 2013 – **Good Coding Practice for Scientists:** I developed a new course at UCL & Oxford for scientists who write computer code, introducing professional programming concepts and techniques to researchers. I have also given two national seminars.
- 2011 – 2012 **Question setter for MRCP part I exam:** designed 20 MCQ questions per year.
- 2011 – 2012 **Lecturer for UCL MSc in Neurology:** lectured a 4 week course in postgraduate clinical neurology for 2 years
- 2010 – present **Examiner for medical school finals** Royal Free and UCL Medical Schools (2010 – 2012), Oxford (2015 – present)
- 2007–2010 **Queen Square Neurology Course:** Paid tutor for MRCP part III examination at the National Hospital for Neurology and Neurosurgery (3 courses).
- 2002–2005 **Cambridge University Distributed Opportunities System (CUDOS) project:** Lead programmer for team of 10 students funded by a National Teaching Fellowship, developing web-based educational software to bridge the gap for medical students between A-levels and University.

2003–
present **Clinical Teaching** throughout my clinical career I have committed to: regular bedside teaching sessions, formal simulations, neurology lectures, student grand rounds.

MANAGEMENT

Experience

2018 Central University Research Ethics Committee member
 2017- Deputy Training Programme Director for SHOs in Neurology
 2016-2017 Trust Peer Reviewer (local care quality assurance)
 2016-2018 CQC Specialist Advisor (national panel)
 2015- Director, Cloisters Management Company Ltd

Courses

2014 Imperial College Leadership and Management Course for Clinicians
 2013 Good Clinical Practice in Research
 2013 Medical Leadership Competency Framework assessment
 2013 Leadership and Management: Preparing a Business Case (RSM mini-MBA)
 2012 Managing Team and Self (UCL Training for Researchers programme)
 2010 Risk Management course (MPS)

Audits

2013 Changes in referrals to the Programmed Investigation Unit (St Mary's Hospital)
 2008 Acute Neurology ward referrals at Charing Cross Hospital, & audit presentation
 2005 Audit on Admission & Discharges at the Acute Brain Injury Unit
 2004 Management of acute pain in children with fractures
 2003 The role of temporal artery biopsy in the management of temporal arteritis.
 2003 Management of new-onset atrial fibrillation in acute surgical patients.

PROFESSIONAL MEMBERSHIP

2006– Royal College of Physicians (MRCP)
 2012– Association of British Neurologists
 2013– Society for Neuroscience
 2016– British Psychological Society (MBPsS)
 2017– Software Sustainability Institute

MEDICAL COMPUTER PROGRAMMING

- 2012 **NeuroSlice:** I wrote a smartphone “app” for teaching neuroanatomy. The app presents labelled histological brain slices and MRI scans on the phone screen, and provides a quiz mode for self-testing. Useful to medical students, neuroscientists and clinicians alike, it has attracted over 20,000 active users. It is free to download and was a paid commission from Taylor and Francis publishers.
<https://play.google.com/store/apps/details?id=org.homphysiology.neuroslice>
- 2002 to present **Human Physiology Modeling Project:** Department of Physiology, Cambridge University. The software has been integrated into the undergraduate Physiology and Medicine courses at Cambridge for over 15 years. <http://www.homphysiology.org>
 I am the programmer of this realistic computerized numerical model of the whole of human physiology. The focus is currently on normal physiology and homeostasis, but is being extended to cover disease processes, and also modeling of treatment. The simulation unifies the principles of cardiovascular, respiratory, renal and metabolic physiology.
- Summer 2000 **NeuroLab** software is sold with the undergraduate textbook: Carpenter, RHS, *Neurophysiology*, Hodder Arnold 2012, ISBN 1444135171
 I wrote academic software for teaching undergraduate neurophysiology. The 30 interactive models demonstrates many neurophysiological principles ranging from ion currents in the action potential, neural adaptation and synaptic learning, to neuroanatomy and motivational models.
- 2015 (in production) **Medical Lists:** I am currently developing a mobile phone app for revising lists for medical exams. Detail is sufficient for MRCP or finals, and can be used for reference on the ward.
- 2017 **NeuroSim:** a neurology simulator for teaching functional neuroanatomy to medical students and neuroscientists. Currently integrated into the Clinical Medicine course at University of Oxford.

In addition I have a working knowledge of the following programming languages:
 C, C++, Visual BASIC, Java, Forth, Python, MATLAB, Pascal, and assembly language (80x86)

EXTRA-CURRICULAR

- 2009–2015 Chantage (London Chamber Choir) – member and assistant conductor
 2010–2012 Conductor of the Queen Square Choir
 2006 The Holst Singers (London Chamber Choir)
 2001 Intermediate Certificate in German
 2000 Conductor of Caius College Orchestra
 2000 Two compositions performed on Radio 3
 1997–2000 Choral scholar of Caius College
 1997–2000 University Chamber Choir
 1999 Cambridge University Singers
 1997 Served on College Music Society Committee
 1999–2000 Rowed for College (8th VIII)
 Ballroom Dancing
 Member of CU Scientific Society
 Music: Grade 7 Piano, Grade 7 French Horn, Grade 5 Trumpet, St. Nicholas Chorister Award, Head Chorister of Portsmouth Cathedral Choir

REFEREES:

1. Previous Academic Supervisor

Prof. Masud Husain
Professorial Fellow in Cognitive Neurology
New College
Oxford OX1 3BN
Tel: 01865 279500
Email: masud.husain@ndcn.ox.ac.uk

2. Previous Head of Department

Prof. Chris Kennard
Professor of Clinical Neurology
Nuffield Department of Clinical Neuroscience
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Secretary: toria.summers@ndcn.ox.ac.uk

3. Current Head of Department

Prof. Irene Tracy
Professor of Anaesthetics
Nuffield Department of Clinical Neuroscience
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