

Claudia A.M. Gandini Wheeler-Kingshott

Current Position(s):

Professor of MR Physics, Queen Square MS Centre, Department of Neuroinflammation, UCL Queen Square Institute of Neurology, Faculty of Brain Sciences, UCL, London, WC1N 3BG.

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Source of Funding: HEFCE

Education/Qualifications

<u>Dates</u>	<u>Details of degree; diploma; other qualification</u>	<u>Institution</u>
1994:	University Diploma in Physics,	Universita degli studi di Pavia, Italy
1999:	PhD in MR Physics, University of Surrey,	Guildford, UK

Professional History (since 1999)

<u>Dates</u>	<u>Details of position held</u>	<u>Institution</u>
01/99-03/02:	Research Fellow, Department of Neuroinflammation, Funded by the UK MS Society	UCL Institute of Neurology, London
04/02-12/04:	Senior Research Fellow & Honorary Lecturer, Dept. of Neuroinflammation, Funded by the UK MS Society	UCL Institute of Neurology, London.
12/03-12/04:	Adoption leave - employment break	
12/04-12/06:	Senior Research Fellow, Dept. of Brain Repair & Rehabilitation, (20% FTE only, compatible with the adoption of 3 children) Funded by the Wellcome Trust	UCL Institute of Neurology, London.
01/05-02/06:	MRI Physics (Consultant), (41% FTE). Funded by MR Solutions Ltd.	MR Solutions Ltd. Guildford, UK.
01/07-02/09:	Honorary Senior Lecturer & Senior Research Fellow, Dept. of Neuroinflammation, No funding for this honorary appointment.	UCL Institute of Neurology, London.
03/09-09/12:	Senior Lecturer in MR Physics, Dept. of Neuroinflammation, HEFCE funded	UCL Institute of Neurology, London.
10/12-09/15	Reader in MR Physics; HEFCE funded	UCL Institute of Neurology, London.
10/15–to-date:	Professor of MR Physics; HEFCE funded	UCL Institute of Neurology, London.

Professional Awards

- Fellow of the International Society for Magnetic Resonance in Medicine (ISMRM) since June 2018

Professional Activities

- Head of the NMR Research Unit, Queen Square MS Centre, UCL
- UCL representative member of the WT 7T London facility operation committee
- Director of the International School of Brain Cells and Circuits, Ettore Majorana Foundation and Centre for Scientific Culture, Erice (Italy)
- Director of the Brain MRI 3T Mondino Research Center, IRCCS Mondino Foundation, Pavia, (Italy)
- Deputy Head of the Division of Neuroradiology and Neurosurgery, UCL Institute of Neurology, UK

- Member of the ad hoc committee for Women in ISMRM (2018-ongoing)
- Member of the Board of Trustees of the International Society for Magnetic Resonance in Medicine (ISMRM, 2015-2018)
- Co-editor of Functional Neurology (2013-2016)

Grants

- UCL GCRF (2021): “Pneumonia diagnostic support system using AI and lung ultrasound portable probes: COVID-19 versus other bacterial lung diseases”. £99,714. PI: CAM Wheeler-Kingshott
- MRC (2019-2023): “A 5 year prospective follow-up clinical and imaging investigation of demyelinating clinically isolated syndrome (CIS)”. £998,027. PI: A Toosy. Co-Is: CAM Wheeler-Kingshott, O Ciccarelli.
- BRC (2019-2021): “In vivo sodium quantification system (SQS) using MRI”. £195,455. PI: CAM Wheeler-Kingshott
- UK MS Society (2017-2021): “Advanced MRI to investigate progression in MS”. £366,687.00. PI: CAM Wheeler-Kingshott
- European Commission (Horizon2020 programme) (2015-2021): “CDS-QUAMRI: A Clinical Decision Support system based on Quantitative multimodal brain MRI for personalized treatment in neurological and psychiatric disorders”. £2,400,000 (UCL: £400,000). UCL-PI: CAM Wheeler-Kingshott.
- Wings for Life. “The sensitivity of intracellular sodium accumulation to tissue damage in spinal cord injury: a multi-parameter study”. 2015-2021. €280,000. PI: Claudia Wheeler-Kingshott.

Research activities

Professor of magnetic resonance physics at the University College London Institute of Neurology (UCL IoN, London, UK) and at the University of Pavia (UNIPV, Italy), she has gained international recognition for her ground-breaking research on translational MRI to study microstructural and functional properties of the central nervous system (CNS). She has developed highly-innovative brain and spinal cord imaging techniques, published in seminal research articles placing her in a leading position world-wide as a prominent MR physicist in neurology. Graduated in Solid State Physics at the University of Pavia in 1994, she moved to the UK where she achieved her PhD in MR Physics at the University of Surrey. In 1999 she joined the NMR Research Unit, Queen Square Multiple Sclerosis Centre at the UCL Queen Square IoN where she based her academic career. Here, she soon developed the ZOOM technique for diffusion imaging of the spinal cord, now recognised as a key step change in spinal cord imaging. She strived to establish her track record, developing national and international collaborations always with the aim of promoting quantitative imaging biomarkers of the CNS and their translation to the clinics. In this context, Claudia’s group works on implementing multi-modal imaging to understand mechanisms of normal and pathological brain and spinal cord, including microstructural techniques, functional MRI, spectroscopy and sodium imaging. Applications are in the field of inflammatory and neurodegenerative diseases (Multiple sclerosis at UCL and Alzheimer disease at UNIPV). She has recently published the first ever worldwide implementation of using sodium imaging to access brain function. Recent work sees Prof Claudia involved in promoting also cross-fertilisation between fields and across scales because she believes that MRI cannot unleash its true potential unless we cross bridges towards other biophysical disciplines.

Research group

To be able to pursue her translational and cross-disciplinary research programme Prof Claudia leads two research groups, one at UCL and one at UNIPV, which are already very well integrated in terms of expertise and productivity. She supervises 9 research fellows in PostDoctoral positions, 5 MPhil/PhD students and several master students. She counts on world-wide collaborations with colleagues specialised in medical physics, neurology, Physiology and neuroscience for an all-round vision of the human brain in health and disease.

Some examples of relevant publications

Gloria Castellazzi, Stefania D. Bruno, Ahmed T. Toosy, Letizia Casiraghi, Fulvia Palesi, Giovanni Savini, Egidio D'Angelo, Claudia Angela Michela Gandini Wheeler-Kingshott Prominent Changes in Cerebro-Cerebellar Functional Connectivity During Continuous Cognitive Processing. *Front Cell Neurosci.* 2018; 12: 331. Published online 2018 Oct 1. doi: 10.3389/fncel.2018.00331

Claudia Angela Michela Gandini Wheeler-Kingshott*, Frank Reimer, Fulvia Palesi, Antonio Ricciardi, Gloria Castellazzi, Xavier Golay, Ferran Prados Carrasco, Bhavana Solanky, Egidio Ugo D'Angelo. Challenges and perspectives of functional sodium imaging (fNaI). *Front Neurosci.* 2018; 12: 810. Published online 2018 Nov 9. doi: 10.3389/fnins.2018.00810

Egidio D'Angelo and Claudia Gandini Wheeler-Kingshott. Modelling the brain: Elementary components to explain ensemble functions. *Rivista del Nuovo Cimento* 2017 40:297-333. Doi: 10.1393/ncr/i2017-10137-5

Alahmadi AA, Pardini M, Samson RS, D'Angelo E, Friston KJ, Toosy AT, Gandini Wheeler-Kingshott CA. Differential involvement of cortical and cerebellar areas using dominant and nondominant hands: An fMRI study. *Hum Brain Mapp.* 2015 Dec;36(12):5079-100. doi: 10.1002/hbm.22997. Epub 2015 Sep 29. PubMed PMID: 26415818; PubMed Central PMCID: PMC4737094.

Palesi F, Tournier JD, Calamante F, Muhlert N, Castellazzi G, Chard D, D'Angelo E, Wheeler-Kingshott CA. Contralateral cerebello-thalamo-cortical pathways with prominent involvement of associative areas in humans in vivo. *Brain Struct Funct.* 2015 Nov;220(6):3369-84. doi: 10.1007/s00429-014-0861-2. Epub 2014 Aug 19. PubMed PMID: 25134682; PubMed Central PMCID: PMC4575696.

Samson RS, Ciccarelli O, Kachramanoglou C, Brightman L, Lutti A, Thomas DL, Weiskopf N, Wheeler-Kingshott CA. Tissue- and column-specific measurements from multi-parameter mapping of the human cervical spinal cord at 3 T. *NMR Biomed.* 2013 Dec;26(12):1823-30. doi: 10.1002/nbm.3022. Epub 2013 Sep 16. PubMed PMID: 24105923; PubMed Central PMCID: PMC4034603.

Riemer F, Solanky BS, Stehning C, Clemence M, Wheeler-Kingshott CA, Golay X. Sodium (²³Na) ultra-short echo time imaging in the human brain using a 3D-Cones trajectory. *MAGMA.* 2014 Feb;27(1):35-46. doi: 10.1007/s10334-013-0395-2. Epub 2013 Jul 31. PubMed PMID: 23900703; PubMed Central PMCID: PMC3912357.

Wheeler-Kingshott CA, Cercignani M. About "axial" and "radial" diffusivities. *Magn Reson Med.* 2009 May;61(5):1255-60. doi: 10.1002/mrm.21965.