

## Carmel M Moran PhD

Medical Physics  
Centre for Cardiovascular Science  
University of Edinburgh, EH16 4TJ

Phone: +44 131 242 6319

Web: [http://www.research.ed.ac.uk/portal/en/persons/carmel-moran\(e43fd41f-95f2-42f7-a601-7e5f14c3c19a\).html](http://www.research.ed.ac.uk/portal/en/persons/carmel-moran(e43fd41f-95f2-42f7-a601-7e5f14c3c19a).html)

---

### ACADEMIC RECORD

- 1987-1991 **Doctorate at Institute of Cancer Research**, University of London.  
*Thesis Title:* 'The Physical Basis for Ultrasonic Investigation of Human Skin'
- 1986-1987 **Masters Degree in Medical Physics**, Aberdeen University.  
*Thesis Title:* 'Aspects of Telediaphanography'
- 1982-1986 **II.I Honours Degree in Physics and Applied Mathematics**, Queen's University Belfast

### EMPLOYMENT RECORD

- Jan 2008- Present SHEFC-funded post in Centre for Cardiovascular Sciences, University of Edinburgh
- Aug 2007 **Reader** in Medical Physics, University of Edinburgh
- 2005-2007 **Senior Research Fellow**, University of Edinburgh
- 1996-2005 **Research Fellow**, University of Edinburgh
- 1991-1996 **Research Associate**, Department of Medical Physics & Medical Engineering, University of Edinburgh.

### PROFESSIONAL APPOINTMENTS

- 2014-2016 President of BMUS (British Medical Ultrasound Society)
- 2011 FIoP (Fellow Institute of Physics)
- 2006 FIPEM (Fellow Institute of Physics and Engineering in Medicine)

### EXPERIENCE AND CAREER

My principal field of research is in high frequency ultrasound and ultrasonic contrast agents. I completed my PhD using high frequency ultrasound to image both normal and abnormal human skin models. I have extended this research over the past 20 years to manufacture and characterize ultrasonic contrast agents both for clinical and preclinical studies resulting in prizes at both national and international level. In 2008 with Wellcome Trust funding I established the preclinical ultrasound imaging facility at the University of Edinburgh and have recently been part of a successful application to establish a large animal imaging facility. I am immediate past President of the British Medical Ultrasound Society.

### SELECTED PROFESSIONAL ACTIVITIES

#### IPEM

- 1996-1998 Ultrasound NIR topic group
- 2006-20010 Member of Ultrasound NIR topic group (BMUS representative)

#### British Society of Echocardiography (BSE)

- 1998-2000** Co-opted member of BSE council

## **British Medical Ultrasound Society (BMUS)**

2014-2016	President of the British Medical Ultrasound Society
2012-2014	President-elect of the British Medical Ultrasound Society
2010-2012	Secretary of the British Medical Ultrasound Society
2008-2010	Chair of the Scientific and Education committee of the British Medical Ultrasound Society

## **Editorial Boards**

2016- Ultrasound in Medicine and Biology Editorial advisory board

## **INDICATORS OR ESTEEM (personal and other)**

- 2014 Young Investigator Award judge at Euroson (26<sup>th</sup> Congress of the European Federation of the Societies of Ultrasound in Medicine and Biology), Tel Aviv
- 2008 Best poster award, British Medical Ultrasound Society Annual Scientific Meeting ‘A new protocol for the evaluation of Doppler dynamic range. King D, Moran CM, Hussy M, Browne JE.
- 2005 Poster award at British Medical Ultrasound Society Annual Scientific Meeting ‘High frequency ultrasonic imaging of contrast agents attached to surfaces’ Butler M, Moran CM, Oliver C, Ross J, Ansell I, Anderson T, McDicken WN.
- 1999 IPEM Founder’s Prize 1999.
- 1999 Best oral presentation at British Medical Ultrasound Society Annual Scientific Meeting
- 1998 Winner of the IPEM /Wisconsin Travel Award
- 1998 Winner of Young Investigator Award, Euroecho-Imaging (2<sup>nd</sup> Annual Congress of the European Society of Cardiovascular Imaging), Trieste, Italy ‘Quantification of the enhanced backscatter phenomena from an intravenous ultrasonic contrast agent’.
- 1996 2<sup>nd</sup> place at Young Investigator session at Euroson (8<sup>th</sup> Congress of the European Federation of the Societies of Ultrasound in Medicine and Biology), Budapest 1996.
- 1995 Winner of Young Investigator Award at British Medical Ultrasound Society Annual Scientific Meeting. ‘Quantison Depot - a new approach to quantifiable myocardial echo enhancement’
- 1994 Poster prize, British Medical Ultrasound Society Annual Scientific Meeting. The variation of ultrasonic integrated backscatter in human hearts from two transthoracic apical views. Moran CM, Lange A, Palka P, Fenn LN, Sutherland GR, McDicken WN.

## **CURRENT GRANT FUNDING: competitive peer-reviewed: Total = £1.9M**

- EPSRC network pilot funding: Investigation of the ability of gas-filled nano-bubbles to deliver hydrophobic and hydrophilic compounds to the brain by disruption of the blood brain barrier (BBB) using focused ultrasound. **Moran CM (PI)**, Holmes M, Anderson T, Evans S. £44,503, 2017-2018.
- The Centre for Sensors and Imaging Systems (CENSIS): Objective measurements of image quality to enhance the commercial development cycle of veterinary ultrasound scanners. **Moran CM (PI)**, Pye SD, Picken A. £102,669, 2017-2018.
- Cancer Research UK - Development of non-ionising and non-invasive, personalised colorectal cancer staging using novel multimodal contrast agents and magnetomotive ultrasound imaging. Mulvana H, Moug S, **Moran CM (Co-I)**, Farrington S, Jansson T. £458K 2017-220.
- Wellcome Trust ISSF3 Funding: Marchenko medical ultrasound imaging: translating Geophysical imaging to medical science. Curtis A, **Moran CM (CO-I)**, Mulholland T. £41,500, 2017.
- Bowel and Cancer Research Grants - Contrast enhanced ultrasound (CEUS) to advance individual staging and treatment planning in rectal cancer. Moug S, Mulvana H, **Moran CM (CO-I)**. £49,319 2017-2018.
- The Wellcome Trust - A large animal critical-care laboratory with 24/7 specialist anaesthesia support - a UK national resource for scientists working in translational research. Eddleston M, Clutton E, Hume D, Argyle D, Baker AH van Beek E, Rutherford K, **Moran CM (CO-I)**, Swedlow J. £1.25M 2014-2019.

## **INVITED CONFERENCE PRESENTATIONS (total = 26, 11 international noted below)**

- ‘The performance of ultrasound scanners – a 10 year review’ Plenary lecture at the Australasian Society of Ultrasound in Medicine Annual Scientific Meeting, Brisbane, Oct 2016.
- ‘Acoustic characterisation of ultrasonic contrast agents’ Australasian Society of Ultrasound in Medicine Annual Scientific Meeting, Brisbane, Oct 2016.
- ‘The use of ultrasound in translational research’ Australasian Society of Ultrasound in Medicine Annual Scientific Meeting, Brisbane, Oct 2016.
- ‘Ultrasound safety’ Australasian Society of Ultrasound in Medicine Annual Scientific Meeting, Brisbane, Oct 2016.
- ‘Acoustical Characterisation of ultrasonic contrast agents’ Dublin Institute of Technology, Dublin, June 2016.
- ‘Of mice and men – the use of contrast agents in preclinical ultrasound research’ Dublin Institute of Technology, Dec 2014.
- ‘Of mice and men – high frequency ultrasound for clinical and preclinical applications’ International Conference on Biomedical Ultrasound Taipei, Taiwan 22-23 October 2013.
- ‘Introduction to Contrast Imaging’ BMUS Ultrasound Contrast Day, May 2010. Dublin, Ireland
- ‘Ultrasonic contrast microbubble detection techniques’. Euroecho 10, Prague, December 2006.
- ‘Snap, crackle and pop, the story of ultrasound contrast agents’ Irish Association of Physical Scientists in Medicine, Dublin, May 2006.
- ‘Therapeutic applications of microbubbles’. Romanian Society of Ultrasound Medicine and Biology, Timisoara, Romania, May 2006.
- ‘Therapeutic applications of microbubbles’. European Congress of Radiology, Vienna, March 2006.
- ‘Targeted microbubbles for atherosclerotic plaque’. The Ninth European Symposium on Ultrasound Contrast Imaging, Rotterdam, January 2004.

## **Recently authored book chapters (total 7, 5 as first author)**

- Moran CM, Butler MB. Contrast Agents in ‘Diagnostic Ultrasound Physics and Equipment 3<sup>rd</sup> Edition’. Eds Hoskins P, Martin K and Thrush A. 2017 P181-195 (in preparation).
- Moran CM. Ultrasound contrast agents; in ‘Clinical Diagnostic Ultrasound 3rd Edition’. Eds. Barnett E and Morley P. (Blackwell Scientific Publishers). 2009.
- Moran CM, Butler MB. Contrast Agents in ‘Diagnostic Ultrasound Physics and Equipment 2<sup>nd</sup> Edition’. Eds Hoskins P, Martin K and Thrush A. 2010 P181-195.
- Moran CM, McDicken WN, Sutherland GR. Ultrasound contrast agents and recent technological developments; in ‘Clinical Diagnostic Ultrasound 2nd Edition’. Eds. Barnett E and Morley P. (Blackwell Scientific Publishers). 1999, pp 82-94.
- Groundstroem KWE, Sutherland GRS, Moran CM, McDicken WN. Myocardial imaging by color-Doppler coded velocity mapping - from regional contraction to tissue characterisation; in ‘Advances in Echo Imaging using Contrast Enhancement’ Eds. Nanda and Schlieff (Kluwer Academic Publishers) 1993, pp359-374.
- Moran CM, McDicken WN, Groundstroem KWE, Sutherland GR. Potential applications of color Doppler imaging of the myocardium in assessing contractility and perfusion. In ‘Advances in Echo Imaging using Contrast Enhancement’ Eds. Nanda and Schlieff. (Kluwer Academic Publishers) 1993, pp359-374.
- McDicken WN, Moran CM. Safety of ultrasound techniques; in ‘Cardiac Ultrasound’ Eds. Roelandt, Sutherland, Iliceto and Linker. (Churchill-Livingstone) 1993, pp85-88.

## SELECTED PEER REVIEWED JOURNAL PUBLICATIONS from 2016

(Total Publications 92, as senior or first author 15)

- Rabell-Montiel A, Browne JE, Pye SD, Anderson TA, **Moran CM**. A modified technique for the broadband acoustic characterisation of agar-based tissue mimicking material - a longitudinal study. *Ultrasound Med Biol* (accepted).
- Snowdon VK, Lachlan NJ, Hadoke PWF, Hoy AM, Semple SI, Patel D, Mungall W, Kendall TJ, Thomson A, Lennen RJ, Jansen MA, **Moran CM**, Pellicoro A, Ramachandran P, Shaw I, Aucott RL, Severin T, Dongre N, Saini R, Pak J, Carr D, Yates D, Duffield JS, Webb DJ, Iredale JP, Hayes PC, Fallowfield JA. Serelaxin for the Treatment of Renal Dysfunction in Cirrhosis: Preclinical Evaluation and Results of an Exploratory Randomized Trial. *PLoS Med* 14(2): e1002248.
- Bappoo N, Kelsey L, Parker L, Crough T, **Moran CM**, Thomson A, Holmes M, Wyrwoll C, Doyle BJ. Haemodynamics in a late gestation rat fetoplacental arterial network. *Biomechanics and Modeling in Mechanobiology* (accepted).
- Wang S; Herbst E; Pye S, **Moran CM**; Hossack J. Phantoms with Applications in Molecular Imaging and System Characterization. *Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (TUFFC)* (accepted).
- Richardson RV, Batchen EJ, Darroch R, Pan X, Rog-Zielinska E, Wryzykowska W, Scullion K, Thomson AJW, al-Dujaili EAS Al-Dujail, Diaz ME, **Moran CM**, Kenyon CJ, Gray GA, Chapman KE. Glucocorticoid receptor alters isovolumetric contraction and restrains cardiac fibrosis. *Jnl of Endocrinology* 2017;232:437-450.
- Sun C, Panagakou I, Sboros V, Butler M, **Moran CM**. Influence of temperature, needle gauge and injection rate on the size distribution, concentration and acoustic responses of ultrasound contrast agents at high frequency. *Ultrasonics* 2016;70:84-91.
- Wyrwoll CS, Noble J, Thomson A, Tesic D, Miller MR, Rog-Zielinska EA, **Moran CM**, Seckl JR, Chapman KE and Holmes MC. Pravastatin reverses placental vascular defects, restores fetal growth and normalises cardiac function in a model of fetal programming. *PNAS* 2016;133:6265-6270.
- White C, Jansen M, McGregor K, Thomson A, Richardson R, Mylonas K, **Moran CM**, Seckl J, Walker B, Chapman K. Cardiomyocyte and vascular smooth muscle independent  $11\beta$ -hydroxysteroid dehydrogenase 1 amplifies infarct expansion, hypertrophy and the development of heart failure following myocardial infarction in male mice. *Endocrinology* 2016;157:346-357.
- RJ Piper, MA Hughes, **CM Moran**, J Kandasamy. Focused ultrasound as a non-invasive intervention for neurological disease: a review. *Jnl Neurosurg* 2016;30:1-8