

David J. Lurie

Emeritus Professor at the University of Aberdeen

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QUALIFICATIONS:

B.Sc. Hons. 2(i) Natural Philosophy (Physics)	University of Aberdeen	1979
M.Sc. Radiation Physics	Bart's Medical College, University of London	1980
Ph.D. Medical Physics	Bart's Medical College, University of London	1984

FELLOWSHIP OF PROFESSIONAL BODIES & CHARTERED STATUS:

Fellow of the Institute of Physics (F.Inst.P.)	2005
Fellow of the Institute of Physics and Engineering in Medicine (F.I.P.E.M.)	1998

MEMBERSHIP OF LEARNED SOCIETIES:

Senior Fellow of the International Society for Magnetic Resonance in Medicine
Member of the International EPR (ESR) Society
Member of the European Society of Radiology

ACADEMIC ROLES:

Emeritus Professor	University of Aberdeen	10/2021 - present
Chair in Biomedical Physics	University of Aberdeen	2002 – 09/2021 (retired)
Lecturer / Senior Lecturer	University of Aberdeen	1985 - 2002
Research Assistant / Research Fellow	University of Aberdeen	1983 - 1985

SABBATICALS / VISITING POSITIONS:

Visiting Faculty	Mayo Clinic, Rochester, MN, USA	August 2019
Visiting International Scholar	Ohio State University, USA	August 2004, August 2005
Visiting Scientist (Faculty Position)	Johns Hopkins University Medical School, Baltimore, USA	July 2000 - June 2001

KEY INDICATORS:

- Awarded Senior Fellowship of the International Society for Magnetic Resonance in Medicine (2021)
- Awarded the Academic Gold Medal by the Institute of Physics & Engineering in Medicine (IPEM) (2017)
- Chair of the Communications and Publications Committee of the European Federation of Organisations for Medical Physics (EFOMP), (2020-22)
- Vice-Chair of EU COST Action CA15209 "EURELAX" (2016-21)
- Associate Editor, European Journal of Medical Physics (2019-)
- >35 yr research experience and international reputation in MRI physics, technology, techniques and applications
- £9.9M in research funding as Principal Investigator during 2007-21
- Co-ordinator and PI of €6.6M EU Horizon-2020 research project (9 partners, 6 countries, Jan 2016 – Dec 2019)
- Delivered 101 invited, keynote and plenary lectures world-wide
- Author of 8 book chapters, 86 peer-reviewed papers, 6 patents and over 280 conference abstracts; h-index 23
- Wide experience of teaching, organising and assessing medical physics at postgraduate level

RESEARCH INTERESTS:

I retired in October 2021, having worked in magnetic resonance imaging technology and applications since 1983.

In 1987 I demonstrated a new method of imaging free radicals called Proton-Electron Double-Resonance Imaging (PEDRI) which combines electron spin resonance (ESR) with MRI. My 1988 paper on PEDRI has been cited 172 times (Lurie et al., J.Magn.Reson. **76**, 366-370 (1988); DOI: [10.1016/0022-2364\(88\)90123-0](https://doi.org/10.1016/0022-2364(88)90123-0)).

During the last 15 years of my career, my research concentrated on Fast Field-Cycling MRI (FFC-MRI). Standard MRI scanners operate at a single magnetic field, but FFC-MRI scanners have the ability to switch magnetic field rapidly during a scan, thereby obtaining information on the variation of the NMR relaxation times with magnetic field strength. Results indicate that this can provide a valuable new contrast mechanism for clinical MRI. In 2015 a consortium of seven research laboratories and two companies, coordinated by me, secured €6.60m (£5.92m) from the European Union's Horizon 2020 scheme to develop FFC-MRI as a clinical imaging modality; the "IDentIFY" project ran for 4 years from January 2016.

GRANTS AWARDED DURING LAST 10 YEARS:

During my career I have been awarded a total of £11.1M as Principal Investigator.

Awarding Body	Title	Applicants (PI shown in bold type)	Duration	Amount Awarded
Arthritis Research UK	Assessment of Fast Field-Cycling MRI for the Imaging of Articular Cartilage and Osteoarthritis	G.P. Ashcroft , D.J. Lurie, T.W. Redpath, T. Ahearn, <i>et al.</i>	27 months from November 2011	£190,832
EPSRC	A UK Magnetic Resonance Basic Technology Centre for Doctoral Training (UK-MRBT-CDT)	M. Newton (Warwick) , D.J. Lurie, G. Smith, <i>et al.</i>	84 months from April 2011	£1.98M
EPSRC	Field-Cycling Add-on for Clinical MRI Scanners	D.J. Lurie	12 months from January 2012	£199,618
EPSRC	Zero-Field MRI to Enhance Diagnosis of Neurodegeneration	D.J. Lurie , L.M. Broche, C. Counsell, G. Riedel, A. Murray	43 months from February 2013	£979,173
DSTL	Sensitivity Enhancement Techniques for Magnetic Resonance (Phases 1 and 2)	D.J. Lurie	19 months during 2013-16	£189,256
European Union Horizon 2020	Improving Diagnosis by Fast Field-Cycling MRI (IDentIFY)	D.J. Lurie (Coordinator of 9-centre collaborative project)	48 months from January 2016	£5.69M (€6.60M)
Wellcome Trust ISSF	Preparatory work towards novel breast-scanning technology using Fast Field-Cycling MRI	D.J. Lurie , L.M. Broche, Y. Masannat, T. Gagliardi, S.D. Heys	6 months from December 2017	£19,773
Wellcome Trust ISSF	Feasibility of Recruiting an Early Scottish Knee Osteoarthritis cohort (FRESKO)	C. De Bari , R. Hollick, D.J. Lurie, L.M. Broche, G. Macfarlane, <i>et al.</i>	6 months from June 2019	£19,800
DSTL	Magnetic Resonance Techniques for Explosives Detection	D.J. Lurie	14.5 months total in 2017, 2018 & 2019	£134,963
European Union Horizon 2020 "ATTRACT"	Monitoring Tissue Implants by Field-Cycling MRI of Quadrupolar-Peak Contrast Agents (QP-MRI)	S. Geninatti-Crich (Turin) , D.J. Lurie, L.M. Broche	12 months from May 2019	£89,183 (€100,000)
Chief Scientist Office, Scottish Government	Proving the Utility of Fast Field Cycling MRI in stroke and small vessel disease (PUFFINS)	M.J. Macleod , D.J. Lurie, L.M. Broche, <i>et al.</i>	24 months from April 2020	£299,590
British Heart Foundation	The Next Leap in Cardiac MRI: Cycling the Field	D. Dawson , D.J. Lurie, L.M. Broche, P.J. Ross, H. Abbas	36 months from August 2020	£300,765
Sir Jules Thorn Charitable Trust	Infrastructure Proposal: Power supply unit for new FFC MRI scanner (equipment funding)	D.J. Lurie	2021	£270,000

INVITED LECTURES AT CONFERENCES AND WORKSHOPS:

I have given 101 lectures as a Plenary, Keynote or Invited speaker, including the following during recent years:

- **April 2019:** Invited lecture at Annual Intl. Meeting of the Royal Society of Chemistry EPR Group, Glasgow, UK.
- **June 2019:** "IPEM John Mallard lecture" at UK Imaging & Oncology Congress, Liverpool, UK.
- **June 2019:** Invited lecture at the AMPERE NMR School, Zakopane, Poland.
- **August 2019:** Invited lecture at the Workshop on Low Field Magnetic Resonance, NIST, Boulder, CO, USA.
- **November 2019:** Invited lecture at the Italian Association of Medical Physics workshop on "New Challenges of Medical Physics", Matera, Italy.
- **November 2020:** Invited lecture at annual meeting of the Scottish Radiological Society (online).
- **March 2021:** Plenary lecture at 18th Intl. School-Conference on Magnetic Resonance & its Applications (online).
- **May 2021:** 2 invited educational lectures and 1 invited scientific lecture at the ISMRM 29th Meeting (online).
- **June 2021:** Invited lecture at the AMPERE NMR School (online).
- **July 2021:** Invited lecture at the 17th EUROMAR conference (online).
- **August 2021:** Invited lecture at the 22nd ISMAR-APNMR conference (online).

PUBLIC-ENGAGEMENT ACTIVITIES:

- **October 2015:** I gave an invited public lecture on MRI in the series “Meet the Expert: James Clerk Maxwell & Electromagnetism” at Aberdeen Science Centre.
 - **April 2016:** Invited to lecture on MRI physics to senior pupils at Belfast High School, Northern Ireland.
 - **May 2017:** “The Hidden World of MRI” – public lecture at the annual May Festival in Aberdeen.
 - **October 2017:** “MRI scanning: a magnetic window to the body” – public lecture in the Café Scientifique series (Waterstone’s bookshop, Aberdeen).
 - **April 2019:** “Stuff Worth Knowing: The Science of MRI” – public lecture at Aberdeen Science Centre.
 - **July 2019:** “Cell Block Science” – engagement event on magnetism and MRI at HM Prison Grampian, Peterhead.
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AWARDS:

- **2017:** Academic Gold Medal of the Institute of Physics and Engineering in Medicine (IPEM – the UK professional body for Medical Physics), for “outstanding contribution to the advancement of academic practice”.
 - **2021:** Senior Fellowship of the International Society for Magnetic Resonance in Medicine (ISMRM), for “significant and substantial contribution to research in a field within the Society’s purposes”.
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EXTERNAL COMMITTEE MEMBERSHIP:

- **2001-08:** Member of the Board of the Royal Society of Chemistry’s ESR Group.
 - **2007-present:** Member of the Fellowship Panel of the Institute of Physics.
 - **2009-13:** Member of the Healthcare Science Advisory Committee (NHS Education for Scotland).
 - **2013-present:** Member of Research Degrees Committee of the University of the Highlands & Islands, UK.
 - **2014-17:** Member (Chair in 2017), Physics in Radiology subcommittee of the European Congress of Radiology.
 - **2016-present:** Vice-Chair of EU COST Action CA15209, “European Network on NMR Relaxometry”.
 - **2018-19:** Member of the Programme Planning Committee of the European Congress of Radiology.
 - **2017:** Scientific Chair of the European School for Medical Physics Experts (MRI), held in Prague (July 2017).
 - **2017-18:** Member of Scientific Committee of the 2nd European Congress of Medical Physics (ECMP 2018), held in Copenhagen (August 2018).
 - **2019-21:** member of Planning Committee of the 3rd European Congress of Medical Physics (ECMP 2020), originally planned for Turin, Italy, but took place as an online event (June 2021).
 - **2019-20:** Vice-chair of Course Accreditation Committee of IPEM.
 - **2020-22:** Chair of Communications and Publications Committee of the European Federation of Organisations for Medical Physics (EFOMP) (Previously Vice-Chair of committee, from 2019.)
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EDITORIAL RESPONSIBILITIES:

- **2018-19:** Guest Editor of Special Issue of the European Journal of Medical Physics (Physica Medica)
 - **2019-present:** Associate Editor of the European Journal of Medical Physics (Physica Medica)
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TEACHING AND SUPERVISION:

- For over 30 years I lectured on MRI physics to students on the University of Aberdeen’s MSc and programmes in Medical Physics.
 - I have supervised 15 Ph.D. students, who successfully graduated. I currently supervise one Ph.D. student.
 - From 1994 to 2005 I organised and lectured on our Department’s annual Aberdeen Summer School on Magnetic Resonance Imaging (a week-long residential course with participants from around the world).
 - In 1996, 2003, 2006 and 2013 I co-organised Schools on MRI at Khon Kaen University, Thailand.
 - From 1999-2009 I lectured on the annual Training Course in Magnetic Resonance Imaging and Spectroscopy, held at the Royal Marsden Hospital, Sutton, Surrey, under the auspices of IPEM.
 - In 2018 I delivered 15 hours of training on MRI Physics for the Institute of Advanced Allied Health Studies of the Hong Kong Hospital Authority. My lectures were attended by approximately 80 health professionals.
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EXTERNAL EXAMINING AND ASSESSMENT:

- External Examiner for PhDs on many occasions, in person at Universities in the UK, Finland and the Netherlands and via written reports for Universities in Australia, India and Malaysia.
 - **2007-10:** External Examiner for MSc in Physical Sciences in Medicine, at Trinity College, Dublin, Ireland.
 - **2011-14:** External Examiner for Master of Medical Physics, University of Malaya, Kuala Lumpur, Malaysia.
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- **2014-18:** External Assessor of Master of Medical Physics degree programme, University of Malaya, Malaysia.
- **2018:** Chief Examiner for Part II Resident Physicist Examinations, Hong Kong Assocn. of Medical Physics.

GRANT REFEREEING:

- Regular reviewer of grant proposals for a number of funding bodies, including UK Research Councils, the European Union (including ERC) and charities.
- Member of the Biomedical Engineering panel of the Academy of Finland's Research Council for Natural Sciences and Engineering (2008 and 2014).
- Member of an EPSRC review panel at EPSRC on Senior Research Fellow applications (2012).
- Member of the Royal Society Challenge Grants Panel (2017-18 and 2018-19).

ADMINISTRATION:

- From 2001 to 2016 I was Co-ordinator of M.Sc. programmes in Medical Physics and Medical Imaging.
- I have sat on many University committees, including Academic Standards Committee (2002-10), Graduate School Committee (2006-16), Quality Assurance Committee (2011-19), University Senate (2015-17).

OTHER INTERESTS:

Playing piano, photography, drawing & painting, cycling

SELECTED RECENT PUBLICATIONS:

- Bitonto V., Ruggiero M.R., Pittaro A., Castellano I., Bussone R., Broche L.M., Lurie D.J., Aime S., Baroni S., Geninatti Crich S. "Low-Field NMR Relaxometry for Intraoperative Tumour Margin Assessment in Breast-Conserving Surgery", *Cancers* 13, 4141 (2021) DOI: [10.3390/cancers13164141](https://doi.org/10.3390/cancers13164141)
- Geninatti Crich S., Di Gregorio E., Bitonto V., Baroni S., Stefania R., Aime S., Broche L.M., Senn N., Ross P.J., Lurie D.J. "Monitoring tissue implants by field-cycling 1H-MRI via the detection of changes in the 14N-quadrupolar-peak from Imidazole moieties incorporated in a "smart" scaffold material", *J. Mater. Chem. B*, 9, 4863-4872 (2021). DOI: [10.1039/D1TB00775K](https://doi.org/10.1039/D1TB00775K)
- Broche L.M., Ross P.J., Kennedy B., MacEachern C., Lurie D.J., Ashcroft G.P. "A New Method for Investigating Osteoarthritis using Fast Field Cycling Nuclear Magnetic Resonance", *Physica Medica*, 88, 142-147 (2021). DOI: [10.1016/j.ejmp.2021.05.034](https://doi.org/10.1016/j.ejmp.2021.05.034)
- Baroni S., Stefania R., Broche L.M., Senn N., Lurie D.J., Ross P.J., Aime S., Geninatti Crich S. "A novel class of 1H-MRI Contrast Agents based on the relaxation enhancement induced on water protons by 14N imidazole moieties", *Angew. Chemie*, 60, 4208-4214 (2021). DOI: [10.1002/anie.202011513](https://doi.org/10.1002/anie.202011513)
- Kruk D., Masiewicz E., Wojciechowski M., Florek-Wojciechowska M., Broche L.M. and Lurie D.J. "Slow dynamics of solid proteins – Nuclear magnetic resonance relaxometry versus dielectric spectroscopy", *J. Magn. Reson.* (2020). DOI: [10.1016/j.jmr.2020.106721](https://doi.org/10.1016/j.jmr.2020.106721)
- Kruk D., Rochowski P., Florek-Wojciechowska M., Sebastião P.J., Lurie D.J., Broche L.M. "1H spin-lattice NMR relaxation in the presence of residual dipolar interactions – Dipolar relaxation enhancement", *J. Magn. Reson.* 318 (2020) DOI: [10.1016/j.jmr.2020.106783](https://doi.org/10.1016/j.jmr.2020.106783)
- Abbas H., Broche L.M., Ezdoglian A., Li D., Yucel R., Ross P.J., Cheyne L., Wilson H.M., Lurie D.J. and Dawson D.K. "Fast field-cycling magnetic resonance detection of intracellular ultra-small iron oxide particles in vitro: Proof-of-concept", *J. Magn. Reson.* (2020). DOI: [10.1016/j.jmr.2020.106722](https://doi.org/10.1016/j.jmr.2020.106722)
- Baroni S., Ruggiero M.R., Bitonto V., Broche L.M., Lurie D.J., Aime S., Geninatti Crich S. "In vivo assessment of tumour associated macrophages in murine melanoma obtained by low-field relaxometry in the presence of iron oxide particles", *Biomaterials* (2020). DOI: [10.1016/j.biomaterials.2020.119805](https://doi.org/10.1016/j.biomaterials.2020.119805)
- Kruk D., Masiewicz E., Borkowska A.M., Rochowski P., Fries P.H., Broche L.M. and Lurie D.J. "Dynamics of Solid Proteins by Means of Nuclear Magnetic Resonance Relaxometry", *Biomolecules*, 9, 652 (2019). DOI: [10.3390/biom9110652](https://doi.org/10.3390/biom9110652)
- Kruk D., Rochowski P., Masiewicz E., Wilczynski S., Wojciechowski M., Broche L.M. and Lurie D.J. "Mechanism of Water Dynamics in Hyaluronic Dermal Fillers Revealed by Nuclear Magnetic Resonance Relaxometry", *ChemPhysChem*, 20, 2816 (2019). DOI: [10.1002/cphc.201900761](https://doi.org/10.1002/cphc.201900761)
- Broche L.M., Ross P.J., Davies G.R., MacLeod M.-J. and Lurie D.J. "A whole-body Fast Field-Cycling scanner for clinical molecular imaging studies", *Scientific Reports*, 9:10402 (2019). DOI: [10.1038/s41598-019-46648-0](https://doi.org/10.1038/s41598-019-46648-0)
- Bödenler M., de Rochefort L., Ross P.J., Chanet N., Guillot G., Davies G.R., Gösweiner C., Scharfetter H., Lurie D.J. and Broche L.M. "Comparison of fast field-cycling magnetic resonance imaging methods and future perspectives", *Molecular Physics*, 117, 832-848 (2018). DOI: [10.1080/00268976.2018.1557349](https://doi.org/10.1080/00268976.2018.1557349)
- Lurie D.J., Ross P.J. and Broche L.M. "Techniques and Applications of Field-cycling Magnetic Resonance in Medicine", in: "Field-cycling NMR Relaxometry: Instrumentation, Model Theories and Applications"; New Developments in NMR No. 18, Kimmich R., ed., Royal Society of Chemistry, UK, pp 358-384 (2018). DOI: [10.1039/9781788012966](https://doi.org/10.1039/9781788012966)
- Kishimoto S., Cherukiri M.K., Khramtsov V.V., Utsumi H. and Lurie D.J. "In vivo Application of Proton Electron Double Resonance Imaging", *Antioxidants & Redox Signaling*, 28, 1345-1364 (2018). DOI: [10.1089/ars.2017.7341](https://doi.org/10.1089/ars.2017.7341)
- Zampetoulas V., Lurie D.J. and Broche L.M. "Correction of Environmental Magnetic Fields for the Acquisition of Nuclear Magnetic Relaxation Dispersion Profiles Below Earth's Field", *J. Magn. Reson.*, 282, 38-46 (2017). DOI: [10.1016/j.jmr.2017.07.008](https://doi.org/10.1016/j.jmr.2017.07.008)
- Broche L.M., Ross P.J., Davies G.R. and Lurie D.J. "Simple algorithm for the correction of MRI image artefacts due to random phase fluctuations", *Magn. Reson. Imaging*, 44, 55-59 (2017). DOI: [10.1016/j.mri.2017.07.023](https://doi.org/10.1016/j.mri.2017.07.023)
- Ross P.J., Broche L.M. and Lurie D.J. "Rapid Field-Cycling MRI using Fast Spin-Echo", *Magn. Reson. Med.*, 73, 1120 (2015). DOI: [10.1002/mrm.25233](https://doi.org/10.1002/mrm.25233)
- Pine K.J., Goldie F. and Lurie D.J. "In vivo field-cycling relaxometry using an insert coil for magnetic field offset", *Magn. Reson. Med.* 72, 1492-1497 (2014). DOI: [10.1002/mrm.25040](https://doi.org/10.1002/mrm.25040)
- Mitchell J., Broche L.M., Chandrasekera T.C., Lurie D.J. and Gladden L.F. "Exploring Surface Interactions in Catalysts using Low Field Nuclear Magnetic Resonance", *J. Phys. Chem. C*, 117, 17699–17706 (2013). DOI: [10.1021/jp405987m](https://doi.org/10.1021/jp405987m)
- Broche L.M., Ashcroft G.P. and Lurie D.J. "Detection of osteoarthritis in knee and hip joints by FFC NMR", *Magn. Reson. Med.*, 68, 358-362 (2012). DOI: [10.1002/mrm.23266](https://doi.org/10.1002/mrm.23266)
- Lurie D.J., Aime S., Baroni S., Booth N.A., Broche L.M., Choi C.-H., Davies G.R., Ismail S., Ó hÓgáin D. and Pine K.J. "Fast Field-Cycling Magnetic Resonance Imaging", *Comptes Rendus Physique* 11, 136-148 (2010). DOI: [10.1016/j.crhy.2010.06.012](https://doi.org/10.1016/j.crhy.2010.06.012)