

CURRICULUM VITAE

Nigel Paul Davies, Ph.D.

- CONTACT DETAILS** Address: RRPPS, UHB NHS Foundation Trust
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Telephone: +44 (0)121 3717000
- EDUCATION** MRI Physics, Ph.D., University of Exeter, UK (1998)
Thesis title: *Magnetic resonance imaging and magnetization transfer of soft-tissues in venous leg ulcers.* (Supervisor: Dr. W. Vennart)
Physics, B.Sc. Honours (2i), University of Southampton, UK (1994)
- QUALIFICATIONS** Clinical Scientist registered with the Health & Care Professions Council
Registration number: CS09702 (since 2005)
Chartered Scientist (CSci) registered with the Science Council
Registration number: PEM108000958 (since 2009)
- MEMBERSHIP** Institute of Physics and Engineering in Medicine: Corporate Member, MIPEM
International Society of Magnetic Resonance in Medicine (ISMRM)
- AWARDS** CSO/NIHR Healthcare Scientist Fellowship (Oct. 2009 – Oct. 2013)
- EMPLOYMENT**
Dates: July 2004 – present
Employer: University Hospitals Birmingham NHS Foundation Trust, Birmingham, UK
& Birmingham Children's Hospital NHS Foundation Trust, Birmingham, UK
Clinical Position: Lead MRI Physicist
Academic Position: Honorary Research Fellow, Cancer Sciences, University of Birmingham, UK

Summary of achievements in clinical role:

- Recruiting and managing a growing team of MRI physicists to deliver a comprehensive package for the support and development of research and clinical MRI services in hospitals across the region.
- Successfully “acceptance testing” a growing number of new MRI scanners (12 so far) and providing an annual quality assurance (QA) programme covering 25 MRI scanners in total.
- Supporting 14 MRI departments to comply with the latest guidelines and legislation concerning MRI safety by carrying out site surveys and risk assessments, advising on local rules, implants and devices and MRI procurement and site planning.
- Developing and improving MR Spectroscopy (MRS) protocols for clinical applications, including radiographer training and support for radiologists and clinicians in reporting and interpreting MRS.
- Participation in neuro-oncology multi-disciplinary team (MDT) meetings contributing to patient care.
- Supporting neuroradiologists and neurosurgeons in the clinical interpretation of MRS and MRSI.
- Development of a clinical fMRI and Diffusion Tensor Imaging (DTI) service for neurosurgical planning in epilepsy and brain tumour patients.
- Facilitating increased capacity of a scientific support and advice service for clinical MRI within the UHB trust and to other hospitals and institutions in the region through the development of business cases for additional posts and research collaborations.

Summary of achievements in research role:

- Playing an important role in a growing childhood cancer imaging research group, supporting and leading in the supervision of masters and PhD students and junior postdoctoral researchers.
- Coordinating protocol development, data collection and QA for functional MRI methods in a multi-centre study of childhood tumours run by the national Childrens Cancer and Leukemia Group (CCLG).
- Development of a decision support system (DSS) to aid diagnosis of childhood brain tumours using pattern recognition of MRS.
- Collaborating internationally with European partners while contributing to the eTUMOUR project.
- Publishing research findings in high-quality peer-reviewed journals.
- Attending national & international meetings to communicate research in oral and poster presentations.
- Successfully applying for funding to pursue my own research ideas through an NIHR fellowship to investigate MR spectroscopy profiling as a diagnostic/prognostic tool for brain tumours in adolescents and young adults and to develop water chemical shift measurements as a novel potential biomarker.
- Developing an independent research group through lead-supervision of a PhD student at the PSIBS Doctoral Training Centre, University of Birmingham.

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- Expanding the research capacity of my research group through a successful grant application the BCH Research Foundation to fund a postdoctoral research fellow.
- Initiated and funded a strategic collaboration with the National Physics Laboratory (NPL) to support the validation of biomarkers developed by my research group.

Summary of achievements in teaching & training role:

- Positive feedback on MRI physics lectures to postgraduate students at University of Birmingham.
- Teaching and supervising numerous medical physics trainees in MRI.
- Supervising and co-supervising 7 PhD students, with 3 successfully completed so far.
- Supervising 5 Masters students carrying out successful mini research projects.

Dates: December 2000 - June 2004

Employer: Centre for Functional Magnetic Resonance Imaging of the Brain (FMRIB), University of Oxford

Academic Position: Postdoctoral Research Fellow

Summary of achievements:

- Engaged in research and support for applications as part of the MRI physics group.
- Developed novel selective arterial spin labeled (S-ASL) perfusion MRI technique.
- Collaborated with clinicians to apply this technique to patients with unilateral carotid artery stenosis.
- Supported a colleague in applying ASL perfusion MRI in a drug study of multiple sclerosis patients.
- Part-supervised a Ph.D. student to further develop ASL perfusion MRI methods.
- Provided teaching on basic MRI physics and advanced perfusion methods for graduate programme.
- Published research findings in high-quality peer-reviewed journals.
- Peer-reviewed two articles for the Journal of Magnetic Resonance Imaging
- Attended national & international meetings to communicate research in oral and poster presentations.

Dates: February 1998-November 2000

Employer: Biomedical Physics Group, School of Physics, University of Exeter

Academic Position: Postdoctoral Research Fellow

Summary of achievements:

- Developed experimental methods and theoretical models of magnetization transfer (MT) imaging.
- Supported several Ph.D. students in applying MT techniques to investigate diseases such as rheumatoid arthritis, liver fibrosis and venous leg ulceration.
- Collaborated with a major pharmaceutical company, applying computational simulations of the MT effect to quantify model system parameters.
- Analysed model system parameters as a function of Agarose gel concentration with a view to allow quantification of fibrosis in diseases such as Cirrhosis of the liver.
- Gained teaching skills through a programme of local training workshops while providing tutorials and laboratory demonstration for undergraduate physics students.
- Published research findings in high-quality peer-reviewed journals.
- Attended national & international meetings to communicate research in oral and poster presentations.

SKILLS & TRAINING

- Experienced operator of MRI scanners from a wide range of manufacturers for quality testing and advanced clinical imaging, including pulse sequence programming on GE, Varian and S.M.I.S systems.
- Good scientific programming skills in MATLAB and C and proficiency in a variety of image, signal processing & data analysis packages.
- Good general computing skills in office software and Windows, UNIX and Linux operating systems.
- Good interpersonal and teamwork skills demonstrated through multidisciplinary collaborations.
- Effective communication and teaching skills demonstrated in small and large group settings.
- Up to date training in Good Clinical Practice.

TEACHING EXPERIENCE

- Various seminars on aspects of MRI physics and applications delivered in both academic and clinical settings to a variety of multidisciplinary audiences.
- MRI Principles & Practice: A series of 4 lectures delivered for the MRP MSc course, School of Physics & Astronomy (2006-2010) & PSIBS Doctoral Training Centre (2012-2013) University of Birmingham.
- Lead supervisor for several postgraduate research students and training supervisor for the Healthcare Scientist Training Program in Imaging with Non-ionising Radiation.

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INVITED TALKS

- *Magnetic Resonance Spectroscopy: methods and applications in adult and childhood brain tumour imaging*
Advanced Neuro MRI conference. Institute of Physics and Engineering in Medicine (IPEM), Austin Court, Birmingham, March 2014.
- *MRI research at the clinical interface: experiences of a NIHR/CSO Healthcare Scientist Research Fellow*
IPEM meeting: Research co-operation between academia and the NHS. Liverpool Hope University, May 2012.
- *Magnetic Resonance Spectroscopy: techniques and applications in neuro-oncology*
Association of Neuro-Oncology Nurses (ANON) annual meeting, Queen Elizabeth Hospital Birmingham, October 2011.
- *Using Functional Imaging as an end point for clinical trials*
Cancer Sciences Workshop, School of Cancer Sciences, University of Birmingham, March 2011
- *Research and Imaging: Current Arrangements for Supporting NHS Research – A personal experience*
IPEM symposium at the UK Radiology Conference, Birmingham, June 2010
- *Pattern recognition of metabolite profiles derived from MRS for classification of childhood brain tumours*
Institute of Cancer Research, Sutton, May 2008.
- *Selective arterial spin labelling (SASL)*
Institute of Child Health, University College London, London, April 2002.

PUBLICATIONS

Peer-reviewed Journal Papers.

1. Babourina-Brooks B, Wilson M, Arvanitis TN, Peet AC, Davies NP. MRS water resonance frequency in childhood brain tumours: a novel potential biomarker of temperature and tumour environment. *NMR Biomed. In press.*
2. Orphanidou-Vlachou E, Vlachos N, Davies NP, Arvanitis TN, Grundy RG, Peet AC. Texture analysis of T1 - and T2 -weighted MR images and use of probabilistic neural network to discriminate posterior fossa tumours in children. *NMR Biomed.* 2014 Jun;27(6):632-9.
3. Novak J, Wilson M, Macpherson L, Arvanitis TN, Davies NP, Peet AC. Clinical protocols for ³¹P MRS of the brain and their use in evaluating optic pathway gliomas in children. *Eur J Radiol.* 2014 Feb;83(2):e106-12.
4. Gill SK, Wilson M, Davies NP, MacPherson L, English M, Arvanitis TN, Peet AC. Diagnosing relapse in children's brain tumors using metabolite profiles. *Neuro Oncol.* 2014 Jan;16(1):156-64.
5. Orphanidou-Vlachou E, Auer D, Brundler MA, Davies NP, Jaspan T, MacPherson L, Natarajan K, Sun Y, Arvanitis TN, Grundy RG, Peet AC. (1)H magnetic resonance spectroscopy in the diagnosis of paediatric low grade brain tumours. *Eur J Radiol.* 2013 Jun;82(6):e295-301.
6. Vicente J, Fuster-Garcia E, Tortajada S, García-Gómez JM, Davies N, Natarajan K, Wilson M, Grundy RG, Wesseling P, Monleón D, Celda B, Robles M, Peet AC. Accurate classification of childhood brain tumours by in vivo(1)H MRS - A multi-centre study. *Eur J Cancer.* 2013 Feb;49(3):658-67.
7. Raschke F, Davies NP, Wilson M, Peet AC, Howe FA. Classification of single-voxel (1) H spectra of childhood cerebellar tumors using lmodel and whole tissue representations. *Magn Reson Med.* 2013 Jul;70(1):1-6.
8. Harris LM, Davies NP, Wilson S, Macpherson L, Natarajan K, English MW, Brundler MA, Arvanitis TN, Grundy RG, Peet AC. Short echo time single voxel 1H magnetic resonance spectroscopy in the diagnosis and characterisation of pineal tumours in children. *Pediatr Blood Cancer.* 2011 Dec 1;57(6):972-7.
9. Hao J, Zou X, Wilson M, Davies NP, Sun Y, Peet AC, Arvanitis TN. A hybrid method of application of independent component analysis to in vivo (1) H MR spectra of childhood brain tumours. *NMR Biomed.* 2012 Apr;25(4):594-606.
10. Davison JE, Davies NP, Wilson M, Sun Y, Chakrapani A, McKiernan PJ, Walter JH, Gissen P, Peet AC. MR spectroscopy-based brain metabolite profiling in propionic acidaemia: metabolic changes in the basal ganglia during acute decompensation and effect of liver transplantation. *Orphanet J Rare Dis.*

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2011 May 9;6:19.

11. Davison JE, Davies NP, English MW, Philip S, Macpherson LK, Gissen P, Peet AC. Magnetic resonance spectroscopy in the diagnostic evaluation of brainstem lesions in Alexander disease. *J Child Neurol* 2011; 26(3):356-60.
12. Gibb AJ, Easton JM, Davies N, Sun Y, MacPherson L, Natarajan K, Arvanitis TN, Peet AC. The development of a graphical user interface, functional elements and classifiers for the non-invasive characterisation of childhood brain tumours using magnetic resonance spectroscopy. *The Knowledge Engineering Review* 2011; 26(3):353–363.
13. Wilson M, Davies NP, Sun Y, Natarajan K, Arvanitis TN, Kauppinen RA, Peet AC. A comparison between simulated and experimental basis sets for assessing short-TE in vivo (1)H MRS data at 1.5 T. *NMR Biomed.* 2010 Dec;23(10):1117-26.
14. Davison JE, Hendriksz CJ, Sun Y, Davies NP, Gissen P, Peet AC. Quantitative in vivo brain magnetic resonance spectroscopic monitoring of neurological involvement in mucopolysaccharidosis type II (Hunter Syndrome). *J Inherit Metab Dis.* 2010 Dec;33 Suppl 3:S395-9.
15. Davies NP, Wilson M, Natarajan K, Sun Y, Macpherson L, Brundler MA, Arvanitis TN, Grundy RG, Peet AC. Non-invasive detection of glycine as a biomarker of malignancy in childhood brain tumours using in-vivo (1)H MRS at 1.5 Tesla confirmed by ex-vivo high-resolution magic-angle spinning NMR. *NMR Biomed.* 2010; 23(1):80-87.
16. Hao J, Zou X, Wilson MP, Davies NP, Sun Y, Peet AC, Arvanitis TN. A comparative study of feature extraction and blind source separation of independent component analysis (ICA) on childhood brain tumour 1H magnetic resonance spectra. *NMR Biomed.* 2009; 22(8):809-18.
17. Wilson M, Davies NP, Brundler MA, McConville C, Grundy RG, Peet AC. High resolution magic angle spinning 1H NMR of childhood brain and nervous system tumours. *Mol Cancer.* 2009;8:6.
18. Wilson M, Davies NP, Grundy RG, Peet AC. A quantitative comparison of metabolite signals as detected by in vivo MRS with ex vivo (1)H HR-MAS for childhood brain tumours. *NMR Biomed.* 2009;22(2):213-9.
19. Harris LM, Davies NP, Macpherson L, Lateef S, Natarajan K, Brundler MA, Sgouros S, English MW, Arvanitis TN, Grundy RG, Peet AC. Magnetic resonance spectroscopy in the assessment of pilocytic astrocytomas. *Eur J Cancer.* 2008;44(17):2640-7.
20. Davies NP, Wilson M, Harris LM, Natarajan K, Lateef S, MacPherson L, Sgouros S, Grundy RG, Arvanitis TN, Peet AC. Identification and characterisation of childhood cerebellar tumours by in-vivo proton MRS. *NMR in Biomed.* 2008;21(8):908-18.
21. Peet AC, Arvanitis TN, Auer DP, Davies NP, Hargrave D, Howe FA, Jaspan T, Leach MO, Macarthur D, MacPherson L, Morgan PS, Natarajan K, Payne GS, Saunders D, Grundy RG; CCLG Functional Imaging Group. The value of magnetic resonance spectroscopy in tumour imaging. *Arch Dis Child.* 2008;93(9):725-7.
22. Harris LM, Davies N, Macpherson L, Foster K, Lateef S, Natarajan K, Sgouros S, Brundler MA, Arvanitis TN, Grundy RG, Peet AC. The use of short-echo-time (1)H MRS for childhood cerebellar tumours prior to histopathological diagnosis. *Pediatr Radiol.* 2007;37(11):1101-1109.
23. Peet AC, Davies NP, Ridley L, Brundler MA, Kombogiorgas D, Lateef S, Natarajan K, Sgouros S, MacPherson L, Grundy RG. Magnetic resonance spectroscopy suggests key differences in the metastatic behaviour of medulloblastoma. *Eur J Cancer* 2007;43(6):1037-1044.
24. Davies NP, Jezzard P. Calibration of gradient propagation delays for accurate two-dimensional RF pulses. *Magn Reson Med* 2005;53:231-236.
25. Davies NP, Jezzard P. Selective arterial spin labelling (SASL): perfusion territory mapping of selected feeding arteries tagged using two-dimensional radio-frequency pulses. *Magn Reson Med* 2003;49:1133-1142.
26. Davies NP, Summers IR, Vennart W. Optimum setting of binomial pulses for magnetization transfer contrast. *J Magn Reson Imaging* 2000;11:539-548.

Oral Presentations at International Conferences (last 5 years)

1. Davies NP, Wilson M, MacPherson L, Janjua U, Oates A, Abernethy L, Arvanitis TN, Peet AC. Added-value of a MRS-based decision support system (DSS) for diagnosing childhood brain tumours. British Society of Neuroradiologists (BSNR) Annual Conference (2014), Belfast, UK.

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2. Grech-Sollars M, Hales PW, Miyazaki K, Raschke F, Rodriguez D, Wilson M, Gill SK, Banks T, Saunders DE, Clayden JD, Gwilliam M, Barrick TR, Morgan PS, Davies NP, Rossiter J, Auer DP, Grundy R, Leach MO, Howe FA, Peet AC, and Clark CA. Multi-centre reproducibility of diffusion MRI parameters for clinical sequences in the brain. Proc. Intl. Soc. Mag. Reson. Med. 22 (2014), Milan, Italy, 56.
3. Babourina-Brooks B, Simpson R, Arvanitis TN, Peet AC, Machin G, Davies NP. *An accurate calibration of MRS thermometry at 3T*. Proc. Intl. Soc. Mag. Reson. Med. 21 (2013), Salt Lake City, US, 533.
4. Tantisatirapong S, Davies NP, Abernethy L, Auer DP, Clark CA, Grundy R, Jaspan T, Hargrave D, MacPherson L, Leach MO, Payne GS, Pizer BL, Peet AC, Arvanitis TN. Automated processing pipeline for texture analysis of childhood brain tumours based on multimodal magnetic resonance imaging, The IASTED International Conference on Biomedical Engineering (BioMed 2013). ACTA Press, Innsbruck, Austria, pp. 376-383.
5. Tantisatirapong S, Davies NP, Rodriguez D, Abernethy L, Auer DP, Clark CA, Grundy R, Jaspan T, Hargrave D, MacPherson L, Leach MO, Payne GS, Pizer BL, Peet AC, Arvanitis TN. Magnetic Resonance Texture Analysis: Optimal Feature Selection in Classifying Child Brain Tumors the XIII Mediterranean Conference on Medical and Biological Engineering and Computing (MEDICON2013). Springer, Sevilla, Spain.
6. Davies NP, Arvanitis TN, Auer D, Grundy R, Howe FA, Hargrave D, Jaspan T, MacPherson L, Natarajan K, Payne G, Saunders D, Sun Y, Wilson M, Peet AC. Multicentre prospective classification of childhood brain tumours based on metabolite profiles derived from 1H MRS. Proc. Intl. Soc. Mag. Reson. Med. 19 (2011), Montreal, Canada, 188.
7. Davies NP, Arvanitis TN, Auer DP, French A, Grazier R, Grundy R, Howe FA, Hargrave D, Jaspan T, Lateef S, Leach MO, MacPherson L, Natarajan K, Payne GS, Orphanidou-Vlachou E, Saunders DE, Sun Y, Wilson M, Peet AC; Multicentre prospective classification of childhood brain tumours based on 1H MRS metabolite profiles. 14th International Symposium on Paediatric Neuro-Oncology (ISPNO), Vienna, Austria, 20th-23rd June 2010.

Poster Presentations at International Conferences (last 5 years)

1. Davies NP, Flintham R, Lim R, Tomlinson JW. In-vivo 1H MRS shows increased liver choline levels in Hepatitis C viral infection. Proc. Intl. Soc. Mag. Reson. Med. 22 (2014), Milan, Italy, 2264.
2. Rodriguez D, Davies NP, Abernethy L, Clark CA, Jaspan T, Hargrave D, MacPherson L, Leach MO, Payne GS, Pizer BL, Peet AC, Arvanitis TN, Grundy R, Auer DP. MRI diffusion histogram analysis in paediatric optic pathway tumours with and without neurofibromatosis. Proc. Intl. Soc. Mag. Reson. Med. 22 (2014), Milan, Italy, 4476.
3. Babourina-Brooks B, Wilson M, Arvanitis T, Peet A, Davies NP. Long echo-time MRS thermometry of childhood brain tumours. Proc. Intl. Soc. Mag. Reson. Med. 22 (2014), Milan, Italy, 1858.
4. Babourina-Brooks B, Wilson M, Arvanitis T, Peet A, Davies NP. Water chemical shift in childhood brain tumours at low echo times: what are we measuring? Proc. Intl. Soc. Mag. Reson. Med. 22 (2014), Milan, Italy, 2942.
5. Tantisatirapong S, Davies NP, Rodriguez D, Abernethy L, Auer DP, Clark CA, Grundy R, Jaspan T, Hargrave D, MacPherson L, Leach MO, Payne GS, Pizer BL, Bailey S, Peet AC, Arvanitis TN. Combining Multi-Centre Conventional and Diffusion MR Texture for the Characterisation of Childhood Brain Tumours. Proc. Intl. Soc. Mag. Reson. Med. 22 (2014), Milan, Italy, 4476.
6. Babourina-Brooks B, Arvanitis TN, Wilson M, Peet AC, Davies N. Investigating the microenvironment of childhood brain tumours using MRS. Proc. Intl. Soc. Mag. Reson. Med. 21 (2013), Salt Lake City, US, 980.
7. Davies NP, Gill SK, MacPherson L, Arvanitis TN, Peet AC. Effects of age on brain tumour metabolite levels measured by in-vivo 1H MRS in children and young people are tumour type specific. Proc. Intl. Soc. Mag. Reson. Med. 21 (2013), Salt Lake City, US, 970.
8. Worthington LA, Wilson M, Arvanitis TN, Peet AC, Davies NP. The effect of Compressed Sensing reconstruction on the spatial resolution of Magnetic Resonance Spectroscopic Imaging. Proc. Intl. Soc. Mag. Reson. Med. 21 (2013), Salt Lake City, US, 2009.
9. Novak J, Wilson M, Davies NP, Arvanitis TN, Peet AC. 31P MRS shows low phosphocholine/glycerophosphocholine in paediatric Optic Pathway Gliomas. Proc. Intl. Soc. Mag. Reson. Med. 21 (2013), Salt Lake City, US, 4036.

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10. Babourina-Brooks B, Simpson R, Arvanitis TN, Peet AC, Machin G, Davies NP. An accurate calibration of MRS thermometry at 3T. ISMSM workshop: Cancer imaging gone multimodal 2013, Valencia, Spain.
11. Babourina-Brooks B, Arvanitis TN, Wilson M, Peet AC, Davies NP. Investigating the microenvironment of childhood brain tumours using MRS thermometry. ISMSM workshop: Cancer imaging gone multimodal 2013, Valencia, Spain.
12. Gill SK, Wilson M, Davies NP, MacPherson L, Arvanitis TN, Peet AC. Novel Biomarkers of Prognosis for Medulloblastomas using 1H-Magnetic Resonance Spectroscopy. 44th Annual Congress of The International Society of Paediatric Oncology (SIOP), London, 2012.
13. Davies NP, Gill SK, Wilson M, MacPherson L, Arvanitis TN, Peet AC. MRS shows metabolite differences with age in children and young people with brain tumours. 15th International Symposium on Pediatric Neuro-Oncology, 24-27 June 2012, Toronto, Canada.
14. Gill SK, Wilson M, Davies NP, MacPherson L, Arvanitis TN, Peet AC. Non-invasive molecular characterisation of medulloblastomas in children. 15th International Symposium on Pediatric Neuro-Oncology, 24-27 June 2012, Toronto, Canada.
15. Rossiter J, Arvanitis TN, Natarajan K, Wilson M, Davies NP, Gill SK, Grazier R, Crouch J, Auer DP, Clark CA, Grundy R, Hargrave D, Howe FA, Jaspan T, Leach MO, MacPherson L, Payne GS, Saunders DE, Peet AC; A Clinical Trials e-Repository with Integrated Conventional and Functional Imaging Data. 15th International Symposium on Pediatric Neuro-Oncology, 24-27 June 2012, Toronto, Canada.
16. Raschke F, Davies NP, Wilson M, Peet AC, Howe FA. Using LCMoDel and whole tissue representations for the classification of single voxel 1H spectra of paediatric brain tumours. Proc. Intl. Soc. Mag. Reson. Med. 20 (2012), Melbourne, Australia, 876.
17. Davies NP, Wilson M, Natarajan K, Orphanidou-Vlachou E, Sun Y, MacPherson L, Brundler MA, Arvanitis TN, Grundy R, Peet AC; Glycine as a potential non-invasive prognostic biomarker in childhood brain tumours. 14th International Symposium on Paediatric Neuro-Oncology (ISPNO) in Vienna, Austria, 20th-23rd June 2010.
18. Davies NP, Saghabi M, Pan X, Arvanitis TN, Peet AC. ¹H MRS temperature calibrations in tissue-equivalent gel phantoms show dependence on macromolecular concentration. Proc. Intl. Soc. Mag. Reson. Med. 19 (2011), Montreal, Canada, 1769.
19. Davies NP, Saghabi M, Pan X, Arvanitis TN, Peet AC. ¹H MRS temperature calibrations in tissue-equivalent gel phantoms show dependence on macromolecular concentration. Proc. Intl. Soc. Mag. Reson. Med. 19 (2011) Montreal, Canada, 2431.
20. Davies NP, Wilson MP, Natarajan K, Sun Y, Lateef S, MacPherson L, Brundler M-A, Arvanitis TN, Grundy RG, Peet AC. Detection of glycine as a biomarker of malignancy in childhood brain tumours using in-vivo 1H MRS at short and long TE. Proc. Intl. Soc. Mag. Reson. Med. (2009), Honolulu, US, 17.