Jack J. Miller

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I am an **interdisciplinary medical physicist** who is experienced in MRI, NMR, and Hyperpolarised Magnetic Resonance research. At present, I have approximately 160 citations, an *h*-index of 8, and growing international recognition as a young expert in my field.

Employment

Novo Nordisk Foundation Postdoctoral Research Fellow
Department of Physiology, Anatomy & Genetics, University of Oxford, April 2017 – 2020

Junior Research Fellow in the Medical Sciences
Wadham College in the University of Oxford, 2017 – 2020

Stipendiary Lecturer in Physics
St. Hugh's College in the University of Oxford, October 2015 –

EPSRC Doctoral Prize Fellow
Departments of Physics and Physiology, Anatomy & Genetics,
University of Oxford, October 2015 – April 2017

Education

DPhil, Condensed Matter Physics and the Life Sciences' Interface Doctoral Training Centre
"Dynamic Nuclear Polarisation as a Probe of Metabolism in Pathophysiology"
University of Oxford, 2011–2016.
Departments of Physics; Physiology, Anatomy, and Genetics; and Radiation Oncology Biology.

My doctorate focussed on the technical development and application of a low-temperature physical technique, Dynamic Nuclear Polarisation, to image the chemical reactions that energetically power life at world-leading spatiotemporal resolution. The main technical development was awarded national and international prizes, and was received by the journal Magnetic Resonance in Medicine with reviewers' comments '*thanking the authors for an excellent contribution to the field*'. It has since become the preferred method to image hyperpolarised compounds *in vivo* internationally.

Commencement, 7/10/2012, Submission 28/9/15, *viva voce* examination 7/12/15, leave to supplicate granted 30/1/2016, graduation 30/9/16.
Supervised by Damian Tyler, Nicola Sibson, Stephen Tucker, and the late Harry Jones.

Associate Fellowship of the Higher Education Academy
Postgraduate teaching qualification.
Awarded 30/9/14 (Recognition Reference PR070128)

MPhys (Hons Oxon.) Physics, St. Hugh's College in the University of Oxford, 2007-2011.
Examiners' Best-in-Year Commendation for laboratory work, 2008, 2009, 2010.
Exhibitioner & Scholar, St. Hugh's College

Research Awards and Prizes

International Society for Magnetic Resonance in Medicine, Junior Fellow, *nominated*, 2018.

Institute for Physics and Engineering in Medicine, Early Career Award, *nominated*, 2018.

International Society for Magnetic Resonance in Medicine, *Summa Cum Laude* [gold] abstract award, *2017*

Divisional Commendation for Excellence, Mathematical, Physical & Life Sciences Division, University of Oxford, *2016*

International Society for Magnetic Resonance in Medicine, Hyperpolarized Media Study Group prize, *2016*

International Society for Magnetic Resonance in Medicine, Young Investigator Award, Finalist (co-author), *2016*

International Society for Magnetic Resonance in Medicine, Hyperpolarized Media Study Group Young Investigator Award, *Finalist, 2015, 2016*

Nicholas Kurti Prize for Condensed Matter Physics, *2015*

British Chapter of the International Society for Magnetic Resonance in Medicine, Oral Presentation Prize, *2015*

EPSRC Doctoral Prize Fellowship, *2015-16*

University of Oxford Doctoral Training Centres 4^{th}-year Award, *2015*

Publications

Peer-Reviewed Journal Articles

21. **Miller, J J.**, Grist, J T., Serres, S S., Fisher, K., Larkin, J., Lau, A Z., Ray, K., Hansen, E S-S., Tougaard, R., Nielsen, P M., Lindhardt, J., Sibson, N R., Laustsen, C L., Gallagher, F A., Tyler, D J. Preclinical Hyperpolarised MRI with ^{13}C Pyruvate and Transport Across the Blood-Brain-Barrier. Nature Scientific Reports, *Submitted, in review*.

20. Timm, K N., **Miller, J J.**, Henry, J A., Tyler, D J. Cardiac applications of hyperpolarized magnetic resonance spectroscopy. Progress in NMR Spectroscopy. *Invited Review, in press.*

19. Lewis, A., **Miller, J J.**, Lau, A Z., Kurtis, K C., Rider, O., Choudhury, R., Neubauer, S., Cunningham, C., Carr, C A., Tyler, D J. (2018) Non-invasive Immuno-metabolic Cardiac Inflammation Imaging Using Hyperpolarized Magnetic Resonance. Circulation Research. *accepted, in press, early view online* doi: 10.1161/CIRCRESAHA.117.312535.
NB: This article was the subject of an editorial in Circ. Research, c.f. Circ. Res. 2018 April; doi: 10.1161/CIRCRESAHA.118.312901

18. **Miller, J J.**, Ball, D. R., Tyler, D. J, Lau, A. Z. (2018) Hyperpolarized Ketone Body Metabolism in the Rat Heart, NMR in Biomedicine, *accepted, in press, early view online* March 2018, doi: 10.1002/nbm.3912 2018;e3912.

17. Stubbs, B. J.; Cox, P. J.; Rhys, E. D.; Santer, P.; **Miller, J J.**; Magor-Elliot, S.; Hiyama, S.; Stirling, M.; Clarke, K. (2017): On the metabolism of exogenous ketones in humans. Frontiers of Physiology, doi:10.3389/FPHYS.2017.00848.

16. **Miller, J J.**, Lau, A Z., Tyler, D J. (2017): Susceptibility-Induced Distortion Correction in Hyperpolarized Echo Planar Imaging, Magnetic Resonance in Medicine, *accepted, early view online*, doi: 10.1002/mrm.26839.

15. **Miller, J J.**, Lau, A Z., Nielsen, P M., McMullen-Klein, G., Lewis, A J., Jespersen, N R., Ball, V., Gallagher, F A., Carr, C A., Laustsen, C., Bøtker, H E., Tyler, D J., Schroeder M. A. (2017): Hyperpolarized [1,4-$^{13}C_2$]Fumarate Enables Magnetic Resonance-Based Imaging of Myocardial Necrosis. Journal of the American College of Cardiology Cardiovascular Imaging, *Accepted, early view online*, doi: 10.1016/j.jcmg.2017.09.020. *This article was also the subject of an editorial in JACC: Cardiovascular Imaging, c.f. JACC: Cardiovascular Imaging, doi: 10.1016/j.jcmg.2017.10.015*

14. Lewis, A., **Miller, J J.**, Rider, O., Choudhury, R., Neubauer, S., Carr, C., Tyler, D J. (2017) Hyperpolarised MRI of cardiac inflammation and repair. The Lancet, 389, S62. doi: 10.1016/S0140-6736(17)30458-0.

13. **Miller, J J.**, Cochlin, L E., Clarke, K C., Tyler, D J. (2017), Weighted Averaging in Spectroscopy Studies, Magnetic Resonance in Medicine, Magnetic Resonance in Medicine, *accepted, in press, early online view*, doi: 10.1002/mrm.26615.

12. Le Page, L., Ball, D., Ball, V., Dodd, M., **Miller, J J.**, Heather, L., Tyler, D J. (2016) Simultaneous in vivo assessment of cardiac and hepatic metabolism in the diabetic rat using hyperpolarised magnetic resonance spectroscopy. NMR in Biomedicine, 29(12): 1759-1767, doi: 10.1002/nbm.3656

11. Lewis, A J M., **Miller, J J.**, McCullum, C., Rider, O., Neubauer, S., Heather, L., Tyler, D J. (2016) Assessment of Metformin Induced Changes in Cardiac and Hepatic Redox State Using Hyperpolarized [1-^{13}C] Pyruvate. Diabetes, 65 (12), 3544-3551.
This article was also the subject of an editorial in Diabetes, c.f. Diabetes 2016 Dec; 65(12): 3529-3531. doi: 10.2337/dbi16-0055

10. Hansen, E S., **Miller, J J.**, Kim, S., Geferath, M., Morrell, G., Laustsen, C. (2016) Fast Padé Transform accelerated CSI for Hyperpolarized MRS, Tomography, Vol. 2, Issue 2, pp. 117-124, doi: 10.18383/j.tom.2016.00154.

9. Lau, A Z., **Miller, J J.**, Tyler, D J. (2016), Simultaneous assessment of cardiac metabolism and perfusion using co-polarized [1-^{13}C]pyruvate and ^{13}C-urea, Magnetic Resonance in Medicine, doi: 10.1002/mrm.26106.

8. Lau, A Z., **Miller, J J.**, Tyler, D J. (2016) Mapping of intracellular pH in the in vivo rodent heart using hyperpolarized [1-^{13}C]pyruvate. Magnetic Resonance in Medicine, doi: 10.1002/mrm.26260

7. Lewis, A J M., McCullum, C., **Miller, J J.**, Rider, O., Neubauer, S., Heather, L., Tyler, D J. (2016) Assessment of Metformin induced changes in cardiac redox state using hyperpolarized [1-^{13}C] pyruvate, Journal of Cardiovascular Magnetic Resonance, doi: 10.1186/1532-429X-18-S1-O24.

6. **Miller, J J.**, Lau, A Z., Teh., I., Schneider, J., Kinchecsh, P., Smart, S., Ball, V., Sibson, N R., Tyler, D J. (2015) Robust, high resolution three-dimensional hyperpolarised metabolic imaging of the healthy rat heart at 7 T. Magnetic Resonance in Medicine, doi: 10.1002/mrm.25730.

5. Lau, A Z., **Miller, J J.**, Robson, M D., Tyler, D J. (2015) Cardiac perfusion imaging using hyperpolarized ^{13}C urea using flow sensitizing gradients. Magnetic Resonance in Medicine, doi: 10.1002/mrm.25713.

4. Seymour, A M L., Giles, L., Ball, V., **Miller, J J.**, Clarke, K C., Carr, C A., Tyler, D J. (2015) In vivo Assessment of Cardiac Metabolism and Function in the Abdominal Aortic Banding Model of Compensated Cardiac Hypertrophy. Cardiovascular Research, ccv101-, doi:10.1093/cvr/cvv101.

3. Lakhal-Littleton, S., Wolna, M., Carr, C A., **Miller, J J.**, Christian, H C., Ball, V., Santos, A., Diaz, R., Biggs, D., Stillion, R., Holdship, P., Tyler, D J., Clarke, K., Davies, B., Robbins, P A. (2015) Cardiac Ferroportin Regulates Cellular Iron Homeostasis and is important for Cardiac

Function. Proceedings of the National Academy of Sciences of the United States of America (PNAS), 112, 3164-9. doi:10.1073/pnas.1422373112.

2. Van Schepdael, A., Ashbourn, J M A., Beard, R., **Miller, J J.**, & Geris, L. (2013). Mechanisms of cell migration in the adult brain: modelling subventricular neurogenesis. Computer Methods in Biomechanics and Biomedical Engineering, 1-10. doi:10.1080/10255842.2013.773979

1. Ashbourn, J M A., **Miller, J J.**, Reumers, V., Baekelandt, V., & Geris, L. (2012). A mathematical model of adult subventricular neurogenesis. Journal of the Royal Society Interface, rsif.2012.0193. doi:10.1098/rsif.2012.0193

Peer-Reviewed Conference proceedings

29. *International Society for Magnetic Resonance in Medicine (June 2018, Paris):* Superresolution Hyperpolarized C13 Imaging with 2D-Linear Prediction and Trigonometric Curves. **Miller**, J J.; Dimoudi, S.; Hess, A.; Tyler, D J.

28. *International Society for Magnetic Resonance in Medicine (June 2018, Paris):* Assessing the optimal preparation strategy to minimize variability of pyruvate dehydrogenase flux measurements with hyperpolarized [1-13C]pyruvate MRS in control and type 2 diabetic rats. Timm, K N.; Apps, A.; Ball, V.; **Miller**, J J.; Dodd, M S.; Tyler, D J.

27. *International Society for Magnetic Resonance in Medicine (June 2018, Paris):* Susceptibility-Induced Distortion Correction in Hyperpolarized Echo Planar Imaging. **Miller**, J J.; Lau, A Z.; Tyler, D J.

26. *International Society for Magnetic Resonance in Medicine (June 2018, Paris):* Imaging inflammation following MI using hyperpolarized pyruvate and 3D Spectral-Spatial EPI. **Miller**, J J.; Lewis, A L.; Carr, C A.; Rider, O.; Neubauer, S.; Tyler, D J.

25. *International Society for Magnetic Resonance in Medicine (June 2018, Paris):* Assessing metabolism and function of normothermically perfused ex vivo livers by multi-nuclear MR imaging and spectroscopy. Young, L AJ.; Ceresa, C DL.; **Miller**, J J.; Valkovic, L.; Voyce, D.; Tunnicliffe, E M.; Ellis, J.; Tyler, D J.; Friend, P J.; Coussios, C C.; Rodgers, C T.

24. *International Society for Magnetic Resonance in Medicine (June 2018, Paris):* The effects of iodinated CT contrast agent on phosphorus MRS. Valkovic, L.; Lau, JYC.; Abdesselam, I.; Rider, O.; Tyler, DJ.; Rodgers, C T.; and **Miller**, J J.

23. *Society for Cardiovascular Magnetic Resonance, January 2018, Barcelona:* Clinical application of cardiac hyperpolarized magnetic resonance: initial experiences. Tyler, D J.; Rider, O.; Dodd, M S.; Lau, A Z.; Lewis, A L.; **Miller, J J.**; Peterzan, M.; Trumper, C.; Neubauer, S. Abstract No. 376559.

22. *British Society for Cardiovascular Research Autumn Meeting, September 2017:* Hyperpolarised Ketone Body Metabolism in the Rat Heart. **Miller**, J J.; Ding, Y B.; Ball, D R.; Lau, A Z.; Tyler, D J. *NB; this is also Hyperpolarised ketone body metabolism in the rat heart,* Heart, *Volume 104, Issue Suppl 3, doi: 10.1136/heartjnl-2018-BSCR.14*

21. *British Society for Cardiovascular Research Autumn Meeting, September 2017:* Hyperpolarized 13C magnetic resonance spectroscopy reveals real-time metabolic flux changes in a rat model of doxorubicin-induced cardiotoxicity. Timm, K N.; **Miller**, J J.; Ball, V.; Henry, J A.; Savic, D.; Dodd, M S.; Tyler, D J. *NB; this is also Hyperpolarized 13C magnetic resonance spectroscopy reveals real-time metabolic flux changes in a rat model of doxorubicin-induced cardiotoxicity,* Heart, *Volume 104, Issue Suppl 3, doi: 10.1136/heartjnl-2018-BSCR.21*

20. *International Society for Magnetic Resonance in Medicine (April 2017, Hawaii):* Ferumoxytol as a blood-pool T2 relaxation agent for 7T phosphorus spectroscopy. **Miller**, J J.; Tyler, D J.; Ball, V.; Rider, O.; Rodgers, C.

19. *International Society for Magnetic Resonance in Medicine (April 2017, Hawaii):* Transport across the blood-brain-barrier may be limiting for hyperpolarized [1-^{13}C]pyruvate neuro-oncology studies. **Miller**, J J.; Larkin, J.; Fisher, K.; Ball, V.; Ray, K.; Serres, S.; Tyler, D J.; Lau, A Z.; Sibson, N R.

18. *International Society for Magnetic Resonance in Medicine (April 2017, Hawaii):* Demonstrating the Randle Cycle in Vivo: Assessment of Physiological Alterations in Human Cardiac Metabolism Using Hyperpolarised ^{13}C MR Spectroscopy. Tyler, D J.; Rider, O.; Dodd, M S.; Lau, A Z.; Lewis, A L.; **Miller, J J.**; Peterzan, M.; Trumper, C.; Neubauer, S.

17. *International Society for Magnetic Resonance in Medicine (April 2017, Hawaii):* Metabolic Changes in the Heart Precede Functional Changes in a Rat Model of Doxorubicin-Induced Cardiotoxicity. Timm, K N.; **Miller, J J.**; Savic, D.; Ball, V.; Giles, L F.; Chong, C-R.; Dodd, M S.; Tyler, D J.

16. *International Society for Magnetic Resonance in Medicine (April 2017, Hawaii):* The use of weighted averaging in spectroscopy studies improves statistical power. **Miller, J J.**; Cochlin, L E.; Tyler, D J.; Clarke, K.

15. *International Society for Magnetic Resonance in Medicine (April 2017, Hawaii):* Bounded rate constant estimation in hyperpolarised [1-^{13}C]pyruvate experiments by a Delayed-rejection Adaptive Metropolis Markov-Chain Monte Carlo (DAM-MCMC) Method. **Miller, J J.**; Lau, A Z.; Tyler, D J.

14. *International Society for Magnetic Resonance in Medicine (April 2017, Hawaii):* Hyperpolarized [1,4-$^{13}C_2$]Fumarate is a probe of necrosis in myocardial infarction. **Miller, J J.**; Lau, A Z.; McMullen-Klein, G.; Lewis, A.; Ball, V.; Carr, C A.; Gallagher, F.; Tyler, D J.; Schroeder, M.

13. *British Society for Cardiovascular Research, Leeds, 2016*: Metformin and the cardiac and hepatic redox state. Lewis, A J M., **Miller, J J.**, McCullum, C., Rider, O., Neubauer, S., Heather, L., Tyler, D J.

12. *International Society for Magnetic Resonance in Medicine (May 2016, Singapore):* Using hyperpolarised ^{13}C-MRS to explore murine skeletal muscle metabolism during exercise. Curtis, MK., Stubbs, B J., Ball, V., Cochlin, L E., **Miller, J J.**, O'Neil, D., Clarke, K C., Robbins, P A., Tyler, D J.

11. *International Society for Magnetic Resonance in Medicine (May 2016, Singapore):* Simultaneous assessment of cardiac metabolism and perfusion using co-polarized [1-^{13}C]pyruvate and ^{13}C-urea. Lau, A Z., **Miller, J J.**, Robson, M. D., Tyler, D J.

10. *International Society for Magnetic Resonance in Medicine (May 2016, Singapore):* In vivo 3D mapping of intracellular pH using hyperpolarized [1-^{13}C]pyruvate in the rodent heart, Lau, A Z., **Miller, J J.**, Tyler, D J. spatial EPI at 7T. **Miller, J J.**, Lau, A Z., Tyler, D J.

9. British Chapter Symposium of *International Society for Magnetic Resonance in Medicine (2015, Stevenage):* High resolution hyperpolarized metabolic imaging with three-dimensional spectral-

8. *International Society for Magnetic Resonance in Medicine (June 2015, Toronto):* The effects of gadolinium on the hyperpolarization of [1-^{13}C]pyruvate at 3.35 T and 5 T. Dodd, M S., **Miller, J J.**, Tyler, D J.

7. *International Society for Magnetic Resonance in Medicine (June 2015, Toronto):* Ferroportin Regulates Cardiac Iron Homeostasis. Lakhal-Littleton, S., **Miller, J J.**, Wolna, M., Carr, C A., Ball, V., Santos, A., Diaz, R., Biggs, D., Tyler, D J., Clarke, K., Davies, B., Robbins, P A.

6. *International Society for Magnetic Resonance in Medicine (June 2015, Toronto):* Flow-sensitizing gradients for first-pass perfusion imaging using hyperpolarized ^{13}C urea in the rat heart. Lau, A Z., **Miller, J J.**, Tyler, D J.

5. *International Society for Magnetic Resonance in Medicine (June 2015, Toronto):* The acute effects of metformin on cardiac and hepatic metabolism: a hyperpolarized [1-^{13}C]pyruvate magnetic resonance spectroscopy study. Lewis, A L., McCullum, C., **Miller, J J.**, Heather, L., Tyler, D J.

4. *International Society for Magnetic Resonance in Medicine (June 2015, Toronto):* Hyperpolarized ketone body metabolism in the in vivo rat heart. Lau, A Z., **Miller, J J.**, Tyler, D J.

3. *International Society for Magnetic Resonance in Medicine (June 2015, Toronto):* High resolution hyperpolarized metabolic imaging with three-dimensional spectral-spatial EPI at 7T. **Miller, J J.**, Lau, A Z., Tyler, D J.

2. *Biomedical Imaging Festival (2013, Oxford):* Metabolic Imaging with Hyperpolarised Spectral-Spatial EPI, **Miller, J J.**, Lau, A Z., Tyler, D J.

1. *4th International Dynamic Nuclear Polarisation Symposium (Helsingør, 2013):* Hyperpolarised cardiac imaging with spectral-spatial EPI. **Miller, J J.**, Lau, A Z., Tyler, D J.

Textbooks

1. "Myocyte Metabolic Imaging with Hyperpolarized MRI", invited chapter in the reference text *Protocols and Methodologies in Basic Science and Clinical Cardiac MRI*, ed. Constantinides, Springer, 2018, ISBN 978-3-319-53000-0.

* *Acknowledgment in* Particle Physics in the LHC Era*, Oxford Master Series, 2016, by Barr, Devenish, Walczak, and Weidberg*

Competitive funding secured

Novo Nordisk Postdoctoral Fellowship, *Salary & Consumables*, £210,446.03, *2017-2020*.

Guarantors of Brain, Travel Grant to ISMRM 2017, £1 000, *April 2017*.

NVidia Corporation, Academic Collaboration Programme, *Equipment gifts*, £3,503.55, *October 2016.*

EPSRC Doctoral Prize Fellowship, *Salary & Consumables*, £40 462, *2015-17*.

John Fell Fund, *Consumables*, £23 142.45, *2013-15*.

Institute of Physics, *Research Student Conference Fund*, £300, *June 2015*.

Barbinder Watson Fund, *Travel grant*, £500, *June 2015*.

EPSRC Travel Grant, *Travel grant*, £1 000, *June 2015*.

British Society for Cardiovascular Research Travel Grant, *Travel grant*, £300, *June 2013*.

Nuffield Foundation Undergraduate Research Bursary, *Stipend*, £1 440, *June 2010*

Students Supervised

6. [redacted]

5. [redacted]

4. [redacted]

3. [redacted]

2. [redacted]

1. [redacted]

Professional Duties

Peer reviewer for *Magnetic Resonance in Medicine*, *NMR in Biomedicine*, the *Canadian Journal of Cardiology*, and *Computers and Medicine in Biology*.

Peer reviewer for funding bodies including the Swiss government and the British Heart Foundation.

Trustee oversight of various organisations; member of the Governing Body of Wadham College; active member of Congregation (co-signatory of motion calling for alterations to proposed pension reform).

Invited lecturer / faculty at ISMRM.

Peer reviewer for the British Chapter of ISMRM, local conference organising committee member for the Annual Meeting of British Chapter ISMRM 2018.

Prelims (1st-year examinations) examiner, University of Oxford.

Invited expert on interview committees.

Experience running capital projects (e.g. commissioned and oversaw preclinical 7T gradient system upgrade; total budget ∼£100k including four external companies engineering to drawings and specifications written)

Teaching experience

Course Design

Department of Biochemistry: Re-wrote undergraduate biochemistry statistics syllabus; changes approved by departmental teaching committee; lecturing first-year undergraduates in the academic year 2017-2018; wrote examination and revision questions.

Life Sciences Interface & Systems Biology DTC "Magnetic Resonance Imaging" module, writing problem sheets with Prof. Damian Tyler. (2012–14)

Radiofrequency Pulse Design, Oxford-Nottingham Biomedical Imaging Doctoral Training Centre, course to first-year graduate students (2015–16).

Department of Physics: Third-year undergraduate Biophysics, wrote problem sheets with Prof. Ard Louis (2015–)

Lecturing

Statistics to first year undergraduate biochemists (Academic Year 2017-18)

Bloch Simulation at the Oxford-Notting Biomedical Imaging Doctoral Training Centre, course to first-year graduate students (Jan. 2015, 2016).

British Heart Foundation Oxford Centre for Research Excellence, lectures on Hyperpolarised Magnetic Resonance to clinical trainees (Jan. 2017)

Tuition

Special relativity, classical mechanics, optics and electromagnetism for first year undergraduate Physicists, *St. Hugh's College*, 2015 —

Electromagnetism and Quantum Mechanics for second year undergraduate Physicists, *St. Hugh's College*, 2015 —

Departmental biophysics tutor for third year undergraduate Physicists, 2011 —
The colleges of St. Hugh's, Brasenose, Oriel, Queen's, Magdalen, New, St. Catherine's, St. John's and Jesus.

Department of Biochemistry Mathematics and Statistics tutor for first year undergraduates, 2012 —

Magnetic Resonance Imaging to first year graduate students, 2012 —

Cardiovascular Magnetic Resonance, British Heart Foundation Centre for Research Excellence, University of Oxford

Hyperpolarization Methods, Oxford Centre for Clinical Magnetic Resonance Research Summer Course.

Other

Admissions:
Interviewing prospective undergraduate physicists, 2015 —
Marking the Physics Aptitude Test, 2014 —

Demonstrating:
Computing to second year physicists (2012-13), first year graduate students (2013-14);
Magnetic Resonance Imaging to graduate students, 2012 —
Exercise Physiology to second year undergraduate medical students, 2015-16.

Scientific Outreach

Communicating science and mathematics is a passion of mine. I have won awards for my outreach activities, finishing second in a national competition called 'I'm a Scientist, Get me out of here!' in 2013, during which I communicated with ∼75 000 people. I have also been interviewed on BBC Radio Oxfordshire describing my research and motivations (2013), taken part in BBC Stargazing Live! (2013, 2014, 2016) and participated in approximately thirty outreach events nationally.

Miscellaneous

Clinical Skills

I am certified competent to perform basic medical procedures such as **phlebotomy**, the placement of indwelling cannulas, familiar with obtaining **informed consent**, and my ability to comply with **Good Laboratory Practice** and **Good Clinical Practice** has been assessed and certified. I am additionally trained in basic first aid, life support, and to observe in sterile environments. I hold a FELASA-certified **HO ASPA licence (Modules 1-4)**, and have done so since 2012.

Relevant Software Experience

Sequence programming on Siemens IDEA, GE EPIC, Bruker Paravision/XWinNMR, and Varian/Agilent VnmrJ. PCB layout and manufacture through Eagle, DipTrace and Altium. Electronic simulation in SPICE. CAD design with Autocad, Solidworks and Autodesk Inventor; 3D

geometry construction in Cinema4D. FEM solving in Comsol and CST Microwave Studio. Statistics with R; extensive experience with XeLaTeX; Matlab, Python, Go, C, C++, Bash, Mathematica and most other good programming languages (as well as several bad ones!)

Professional Memberships

Member of the Institute of Physics
Member of the Institute of Physics and Engineering in Medicine
Member of the British Society for Cardiovascular Research
Trainee Member of the International Society for Heart Research
Trainee Member of the Society for Cardiovascular Magnetic Resonance
Trainee Member of the International Society for Magnetic Resonance in Medicine

Hobbies

As a semi-professional musician, I enjoy both secular and sacred choral singing to a high standard. I am a bass, an organist, pianist, and have a small discography. I have been broadcast singing with various groups on BBC Radio 3, and additionally enjoy occasionally directing small groups of musicians both at home and abroad.

References

DPhil Supervisor
Prof. Damian Tyler
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DPhil Examiner
Prof. Christopher Rodgers
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Wolfson Brain Imaging Centre
Addenbrookes Hospital, Box 65
Cambridge Biomedical Campus
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Collaborator
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