

Sean CL Deoni

Division of Engineering, Brown University, Providence, RI, USA

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Research Positions:

- Present Assistant Professor of Engineering, Division of Engineering, Brown University.
- 2006-2009 MRC Research Fellow
Centre for Neuroimaging Sciences, Institute of Psychiatry, King's College London
- 2006-2008 Postdoctoral Research Fellow
Oxford Centre for Functional Magnetic Resonance Imaging of the Brain, Oxford
Mentor: Heidi Johansen-Berg
- 2005-2008 Postdoctoral Research Fellow
Centre for Neuroimaging Sciences, Institute of Psychiatry, King's College London
Mentors: Derek K. Jones, Steven C.R. Williams, Declan Murphy.

EDUCATION:

- 2000-2004 Ph.D. Medical Biophysics
University of Western Ontario, London, Ontario, Canada
Thesis: Measurement of Structure in the Deep Brain using MRI
Advisors: Terry M. Peters, Brian K. Rutt
- 1995-1999 Honours BSc. Medical Biophysics
University of Western Ontario, London, Ontario, Canada
Thesis: Mathematical Modeling of Thermal Lesions from Radio Frequency (RF) Ablation Tools
Advisor: Terry M. Peters

GRANTS:

- 2009 - 2014 National Institutes of Mental Health (USA) (\$2,600,000)
Title: Imaging White Matter Maturation in Healthy Neurodevelopment
Role: P.I.
- 2009 - 2011 Alzheimer's Association (USA) (\$80,000).
Title: Imaging Myelin Loss Associated with Alzheimer's Disease
Role: PI.
- 2008 - 2013 Medical Research Council (UK) Career Development Fellowship (£1,460,000).
Title: Imaging Myelin Development in Normal and Autistic Neurodevelopment
Role: P.I.
- 2008 - 2009 Canadian Institutes of Health Research (\$70,000).
Title: New Developments in Myelin Imaging with Application to Alzheimer's

Dementia.
Role: Co-Applicant.

AWARDS:

2005 - 2008 Canadian Institutes for Health Research Fellowship (\$150,000).
2000 - 2004 Special University Scholarship, University of Western Ontario (\$35,000).
2004 ISMRM Student Award (\$2000.00).
2002 ISMRM Student Award (\$2000.00).
2001 ISMRM Student Award (\$2000.00).
1996 - 2000 Royal Bank of Canada Academic All-Canadian.

RESEARCH INTERESTS:

Magnetic Resonance Imaging:

- Relaxometry and Diffusion Tensor Imaging in neuro-degenerative disease
- High Resolution Structural Imaging
- Knee, cartilage and sports medicine imaging
- Cardiac and abdominal imaging
- Novel pulse sequence development
- Novel contrast mechanisms
- Rapid imaging methods

COMPUTER / RESEARCH EXPERIENCE:

Pulse Sequence Development Suites:

- General Electric Epic Environment: CNV4, 9x, 11x, 12x, 14x, 15x, 20x
- Siemens IDEA Programming: VA25, VB13
- Experience with GE and Siemens 1.5T and 3T systems, Philips 1.5T systems.

Programming Languages and Analysis Packages:

- C, C++, Objective C, Python, Java, Cocoa
- Matlab, VTK, imageJ, FSL

Platforms:

- Mac OS X, Linux

REFEREED PUBLICATIONS:

- 17) **Deoni SCL**. High Resolution T2 Mapping in the Presence of Large-Scale Bo Field Errors. J. Magn. Reson. Imag. 30; 411-417 (2009).
- 16) Menke RA, Scholz J, Miller KL, **Deoni SCL**, Jbabdi S, Matthews PM, Zarei M. MRI Characteristics of the Substantia Niagra in Parkinson's Disease: A Combined Quantitative T1 and DTI Study. NeuroImage. 47; 435-441 (2009).
- 15) McNab JA, Jbabdi S, **Deoni SCL**, Douaud G, Behrens TE, Miller KL. High Resolution Diffusion Weighted Imaging in Fixed Human Brain Using Diffusion Weighted Steady-State Free Precession. NeuroImage. 46; 775-785 (2009).

- 14) **Deoni SCL**, Rutt BK, Arun T, Pierpaoli C, Jones DK. Gleaning Multi-Component T1 and T2 Relaxation Information from Steady-State Imaging Data. *Magn. Reson. Med.* 60: 1372-1387 (2008).
- 13) **Deoni SCL**, Williams SCR, Jezzard P, Suckling J, Murphy DG, Jones DK. Standardized Structural Magnetic Resonance Imaging in Multicenter Studies using Quantitative T1 and T2 Imaging at 1.5T. *Neuroimage.* 40; 662-671 (2008).
- 12) **Deoni SCL**, Rutt BK, Jones, DK. Investigating Exchange and Multi-Component Relaxation in Fully-Balanced Steady-State Free Precession Imaging. *Journal of Magnetic Resonance Imaging.* J. Magn. Reson. Imaging. 27: 1421-1429 (2008).
- 11) **Deoni SCL**. High Resolution T1 Mapping of the Brain at 3T with Driven Equilibrium Single Pulse Observation of T1 with High-Speed Incorporation of RF Field Inhomogeneities (DESPOT1-HIFI). *Journal of Magnetic Resonance Imaging.* 26: 1106-1111 (2007).
- 10) **Deoni SCL**, Catani M. Visualization of the Deep Cerebellar Nuclei using Quantitative T1 and p Magnetic Resonance Imaging. *NeuroImage.* 37:1260-1266 (2007).
- 9) **Deoni SCL**, Rutt BK, Jones, DK. Investigating the Effect of Exchange and Multi-Component T1 Relaxation on the Short Repetition Time Spoiled Steady-State Signal and the DESPOT1 Quantification Method. *Journal of Magnetic Resonance Imaging.* 25: 570-578 (2007).
- 8) **Deoni SCL**, Rutt BK, Parrent AG, Peters TM. Segmentation of Thalamic Nuclei using a Modified k-Means Clustering Algorithm and High Resolution Quantitative Magnetic Resonance Imaging at 1.5T. *Neuroimage.* 34: 117-126 (2007).
- 7) **Deoni SCL**, Rutt BK, Peters TM. Synthetic T1-weighted Brain Image Generation with Incorporated Coil Intensity Correction using DESPOT1. *Magnetic Resonance Imaging* 24: 1241-1248 (2006).
- 6) **Deoni SCL**, Josseau MJC, Rutt BK, Peters TM. Visualization of Thalamic Nuclei on High Resolution, Multi-Averaged T1 and T2 Maps Acquired at 1.5T. *Human Brain Mapping.* 25: 353-359 (2005).
- 5) **Deoni SCL**, Peters TM, Rutt BK. High Resolution T1 and T2 Mapping of the Brain in a Clinically Acceptable Time with DESPOT1 and DESPOT2. *Magnetic Resonance in Medicine.* 53: 237-241 (2005).
- 4) **Deoni SCL**, Ward HA, Peters TM, Rutt BK. Rapid T2 Estimation using Phase-Cycled Variable Nutation Steady-State Free Precession. *Magnetic Resonance in Medicine,* 52: 435-439 (2004).
- 3) **Deoni SCL**, Peters TM, Rutt BK. Quantitative Diffusion Imaging with a Steady-State Free Precession Sequence. *Magnetic Resonance in Medicine,* 51: 428-433 (2004).
- 2) **Deoni SCL**, Peters TM, Rutt BK. Determination of Optimal Angles for Variable Nutation Spin-Lattice, T1, and Spin-Spin, T2, Relaxation Times Measurement. *Magnetic Resonance in Medicine,* 51: 194-199 (2004).
- 1) **Deoni SCL**, Rutt BK, Peters TM. Rapid Combined T1 and T2 Mapping using Gradient Recalled Echo Acquisition in the Steady State. *Magnetic Resonance in Medicine,* 49: 515-526 (2003).

CONFERENCE PRESENTATIONS:

- *Deoni SCL*, Catani M. Imaging the Deep Cerebellar Nuclei. Human Brain Mapping, Chicago, June 2007.

- *Deoni SCL* High Resolution T1 Mapping with Incorporated Transmit Radio-Frequency Field Inhomogeneity Correction. International Society for Magnetic Resonance in Medicine, Proceedings of the fourteenth scientific meeting: Berlin, May 2007.

- *Deoni SCL* High Resolution T2 and Susceptibility Measurement using Phase-Cycled Steady-State Free Precession. International Society for Magnetic Resonance in Medicine, Proceedings of the fourteenth scientific meeting: Berlin, May 2007.

- *Deoni SCL*, Catani M. Tripping Over Ourselves to Image the Cerebellum. International Society for Magnetic Resonance in Medicine, Proceedings of the fourteenth scientific meeting: Berlin, May 2007.

- *Deoni SCL* Traynor C. Towards Quantitative Magnetic Resonance "Angstromscopy". International Society for Magnetic Resonance in Medicine, Proceedings of the fourteenth scientific meeting: Berlin, May 2007.

- *Deoni SCL*, Rutt BK, Jones DK. Investigating the Effect of Exchange and Multi-Component T1 Relaxation on the Short Repetition Time Spoiled Steady-State Signal and the DESPOT1 Quantification Method. International Society for Magnetic Resonance in Medicine, Proceedings of the thirteenth scientific meeting: Seattle, May 2006.

- *Deoni SCL*, Rutt BK, Jones DK. Investigating Chemical Exchange and Multi-Component T1 and T2 Relaxation in the Fully-Balanced Steady-State Free Precession Signal. International Society for Magnetic Resonance in Medicine, Proceedings of the thirteenth scientific meeting: Seattle, May 2006.

- *Deoni SCL*, Jones DK. MADCOWS: Model-free Analysis of Diffusion Signal using Correlation of Weighted Signals. International Society for Magnetic Resonance in Medicine, Proceedings of the thirteenth scientific meeting: Seattle, May 2006.

- Jones DK., *Deoni SCL* T1 and T2 along Tracts of Interest. International Society for Magnetic Resonance in Medicine, Proceedings of the thirteenth scientific meeting: Seattle, May 2006.

- *Deoni SCL*, Rutt BK, Peters TM. Segmentation of Thalamic Nuclei using High Resolution Quantitative Magnetic Resonance Imaging and a Modified k-Means Clustering Algorithm. International Society for Magnetic Resonance in Medicine, Proceedings of the thirteenth scientific meeting: Miami, May 2005.

- *Deoni SCL*, Rutt BK, Peters TM. Visualization of Thalamic Nuclei on High Resolution, Multi-Averaged T1 and T2 Maps Acquired at 1.5T. International Society for Magnetic Resonance in Medicine, Proceedings of the thirteenth scientific meeting: Miami, May 2005.

- *Deoni SCL*, Rutt BK, Peters TM. Magnetic Resonance Imaging Signal Intensity Correction and Normalization using DESPOT1. International Society for Magnetic Resonance in Medicine, Proceedings of the thirteenth scientific meeting: Miami, May 2005.

- Suan J., *Deoni SCL*, Holdsworth D.W., Rutt BK, High Resolution T1 Mapping at 1.5T and 3T using Gradient Recalled Acquisition in the Steady State. International Society for Magnetic Resonance in Medicine, Proceedings of the thirteenth scientific meeting: Miami, May 2005.

- Suan J., *Deoni SCL*, Holdsworth D.W., Rutt BK, Radial Measurement of T1 and T2 in Healthy Patellar Cartilage. International Society for Magnetic Resonance in Medicine, Proceedings of the thirteenth scientific meeting: Miami, May 2005.

- *Deoni SCL*, Rutt BK, Peters TM. Segmentation of the Thalamic Nuclei Using High Resolution T1 Maps. International Society for Magnetic Resonance in Medicine, Proceedings of the twelfth scientific meeting: Kyoto, May 2004.

- Suan J., *Deoni SCL*, Holdsworth D.W., Rutt BK. Investigation of Knee Cartilage Using High Resolution T1 and T2 Mapping with DESPOT1 and DESPOT2. International Society for Magnetic Resonance in Medicine, Proceedings of the twelfth scientific meeting: Kyoto, May 2004

- Coristine A.J., Foster P., *Deoni SCL*, Heyn C., Rutt BK. Positive Contrast Labeling of SPIO Cells in Cell Samples and Spinal Cord Injury. International Society for Magnetic Resonance in Medicine, Proceedings of the twelfth scientific meeting: Kyoto, May 2004.

- *Deoni SCL*, Peters TM, Rutt BK. High Resolution T1 and T2 Mapping of the Brain in a Clinically Feasible Time. International Society for Magnetic Resonance in Medicine, Proceedings of the twelfth scientific meeting: Kyoto, May 2004.

- *Deoni SCL*, Peters TM, Rutt BK. Quantification of Liver Iron with Rapid 3D R1 and R2 Mapping with DESPOT1 and DESPOT2. International Society for Magnetic Resonance in Medicine, Proceedings of the twelfth scientific meeting: Kyoto, May 2004.

- *Deoni SCL*, Yen Y. Peters TM. Visualization of Neural DTI Vector Fields Using Line Integral Convolution. Medical Image Computing and Computer Assisted Intervention, Proceedings of the sixth annual conference: Montreal, November 2003.

- *Deoni SCL*, Peters TM, Rutt BK. General Determination of Optimal Angles for Variable Nutation Spin-lattice, T1, and Spin-spin, T2, Relaxation Times Measurement. International Society for Magnetic Resonance in Medicine, Proceedings of the eleventh scientific meeting: Toronto, July 2003.

- *Deoni SCL*, Rutt BK, Peters TM. Rapid Combined T1 and T2 mapping using Gradient Recalled Echo Acquisition in the Steady State. International Society for Magnetic Resonance in Medicine, Proceedings of the tenth scientific meeting: Honolulu, May 2002.

- *Deoni SCL*, Rutt BK, Peters TM. An Alternative Method for Visualizing m-Dimensional MRI data. International Society for Magnetic Resonance in Medicine, Proceedings of the ninth scientific meeting:} Glasgow, May 2001.

PATENTS & INTELLECTUAL PROPERTY:

- 1) Title: A Fast Method for Combined T1 and T2 Mapping.
Inventors: Deoni SCL, Rutt, BK. and Peters, TM.
Status: Patent Number: US 20050256393 (Licensed by GE Healthcare)
- 2) Title: Quantitative Diffusion Imaging with an SSFP Sequence.
Inventors: Deoni SCL, Peters, TM. and Rutt, BK.
Status: Patent Pending
- 3) Title: A Fast Method For Correcting Transmit Radio-Frequency Field Inhomogeneities.
Inventors: Deoni SCL.
Status: Patent Pending

- 4) Title: A Method for Receive Field Inhomogeneity Correction
Inventors: Deoni SCL, Brady M, Noterdaeme N
Status: In Application.

- 5) Title: Multiple Component T1 and T2 Determination Using Steady-State Image Data
Inventors: Deoni SCL.
Status: In Application.

INDUSTRIAL RESEARCH EXPERIENCE:

- 02/2002 Student Exchange Internship, ASL Milwaukee
- worked under the supervision of Dr. Jason Polzin to extend the automated post-processing environment to permit 'real-time' calculation of T1 and T2 maps.

TEACHING EXPERIENCE:

- 2000 - 2004 Department of Medical Biophysics
Teaching Assistant, Introduction to General Biophysics
- Led laboratory and tutorial sessions.
- Developed and presented labs and special topic seminars.

- 2000 - 2004 Lets Talk Science Volunteer
- Assisted teachers in designing fun and interesting science experiments (grades 4-11).
- Performed in-class demonstrations and hosted lab tours.

Supervised Students:

Name	Project Title	Year
<i>PhD Students (Co-Supervised)</i>		
Joan Coward	Cerebellar Connections in Autism	2006 -
Catherine Mallik	High Resolution Quantitative Imaging in Alzheimer's Disease	2007 -
Catherine Traynor	Thalamo-Cortical Connections in Epilepsy	2006 -
<i>Fourth-Year Honours Thesis Project Students</i>		
Melissa Josseau	Imaging the Thalamic Nuclei	2003-2004
<i>Summer Students</i>		
Melissa Josseau	Imaging the Thalamic Nuclei	2003, 2004
Adrian Koziak	Optimizing Deep-Brain Image Contrast	2003
Lauren Lucas	Imaging Temperature Distributions	2002
James Odegaard	Phantoms for High Resolution T ₁ and T ₂ Mapping	2001

REFERENCES:

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Cardiff School of Psychology and BioScience
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