

Curriculum Vitae

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Degrees

M.Sc., *Physics*. Minors: *Math* and *computer science*. University of Copenhagen, 1995.
Ph.D., *Chemistry*. University of Copenhagen, 2000.

Experience

Feb 69	Born in Denmark.
Sep 88	Matriculated at <i>University of Copenhagen</i> .
Aug 93 - Feb 94	Conscription.
Feb 94 - May 95	Diploma work. <i>Max-Planck-Institut für Quantenoptik</i> , Garching, Germany.
Jul 95	M.Sc. <i>Physics</i> . Minors: <i>Math</i> and <i>computer science</i> .
Oct 95 - Jan 96	Promotion stipend. <i>Max-Planck-Institut für Quantenoptik</i> .
Feb 96 - Aug 96	Introductory stipend, <i>DRCMR</i> , Hvidovre Hospital
Oct 96 - Oct 99	Ph.D. study, <i>University of Copenhagen</i> .
Oct 98 - Apr 99	Visiting Ph.D. student <i>Lucas MR Center</i> , Stanford University, California.
Oct 99 - Oct 00	Post doc, <i>DRCMR</i> , Hvidovre Hospital.
Feb 00	Ph.D. <i>Chemistry</i> , <i>University of Copenhagen</i> .
Oct 00 - Oct 06	Chief physicist. <i>DRCMR</i> , Hvidovre Hospital.
Oct 02 - May 03	Research Management Course (CBS on behalf of "Rektorkollegiet").
Nov 06 - present	Senior Researcher and Group Leader (Physics and Acquisition). <i>DRCMR</i> , Hvidovre Hospital.
Mar 08 - present	Board member and secretary for the Danish Society for Magnetic Resonance in Medicine.
Oct 09 - present	Associate Professor at the Technical University of Denmark.

Awards

Oct. 2009: The European Society for Magnetic Resonance in Medicine and Biology's Info-RESO Award for software available at <http://www.drcmr.dk/bloch>

Publications

Reports

- L. G. Hanson, *Wave packet dynamics in two-electron atoms; Influence of a strongly driven core resonance* (1995), diploma work. Supervisors: N. O. Andersen (*University of Copenhagen*) and P. Lambropoulos (*Max-Planck-Institut für Quantenoptik*).
- L. G. Hanson, *Fast volumetric magnetic resonance spectroscopic imaging; Methodological developments for echo planar spectroscopy* (2000), thesis. Supervisors: K. Schaumburg and O. B. Paulson (*University of Copenhagen*).

Papers in refereed journals

- L. G. Hanson, J. Zhang and P. Lambropoulos, *Theory of core-resonant ionization*, Euro Phys Lett, **30**(2), 81-86 (1995).
- L. G. Hanson and P. Lambropoulos, *Non-dispersing wave packets in two-electron atoms; atomic mode-locking by loss-modulation*, Phys Rev Lett, **74**, 5009-12 (1995).
- L. G. Hanson, J. Zhang and P. Lambropoulos, *Manifestations of atomic and core resonances in photoelectron energy spectra*, Phys Rev A, **55**, 2232-44 (1997)
- L. G. Hanson, K. Schaumburg and O. B. Paulson, *Reconstruction strategy for echo planar spectroscopy and its application to partially undersampled imaging*, Magn Reson Med, **44**, 412-17 (2000). <http://www.drcmr.dk:8080/19/>.
- L. G. Hanson, E. Adalsteinsson, A. Pfefferbaum and D. M. Spielman, *Optimal voxel size for measuring global gray and white matter proton metabolite concentrations using chemical shift imaging*, Magn Reson Med, **44**, 10-18 (2000). <http://www.drcmr.dk:8080/20/>.
- T. N. Sager, S. Topp, L. Torup, L. G. Hanson, B. Egestad and A. Møller, *Evaluation of CA1 damage using single-voxel 1H-MRS and un-biased stereology: Can non-invasive measures of N-acetyl-aspartate following global ischemia be used as a reliable measure of neuronal damage?* Brain Res, **892**, 166-75 (2000).
- I. K. Andersen, A. Szymkowiak, C. E. Rasmussen, L. G. Hanson, J. Marstrand and L. K. Hansen, *Perfusion quantification using Gaussian process deconvolution*, Magn Reson Med, **48**, 351-61 (2002).
- A. P. Born, I. Law, T. E. Lund, E. Rostrup, L. G. Hanson, G. Wildschjødztz, H. C. Lou and O. B. Paulson, *Cortical deactivation induced by visual stimulation in human slow-wave sleep*, Neuro-image, **17**(3), 1325-35 (2002).
- H. K. Mathiesen, T. Tscherning, P. S. Sørensen, H. B. W. Larsson, E. Rostrup, O. B. Paulson, and L. G. Hanson, *Multi-slice echo planar spectroscopic MR imaging provides both global and local metabolite measures in multiple sclerosis*, Magn Reson Med, **53**, 750-59 (2004).
- T. Stavngaard, L. V. Sjøgaard, J. Mortensen, L. G. Hanson, J. Schmideskamp, A. K. Berthelsen and A. Dirksen, *Hyperpolarised ³He MRI and ^{81m}Kr SPECT in chronic obstructive pulmonary disease*, Eur J Nucl Med Mol Imaging, **32**, 448-57 (2005).
- H. K. Mathiesen, A. S. Nielsen, K. Nielsen and L. G. Hanson, *MR-spektroskopi til vurdering af kognitive forstyrrelser*, Ugeskr Laeger, **168**, 357-59 (2006).
- H. K. Mathiesen, A. Jønsson, T. Tscherning, L. G. Hanson, J. Andresen, M. Blinkenberg, O. B. Paulson and P. S. Sørensen, *Correlation of global N-acetyl aspartate with cognitive impairment in multiple sclerosis*, Arch Neurol, **63**, 533-36 (2006).
- P. S. Sørensen, A. Jønsson, H. K. Mathiesen, M. Blinkenberg, J. Andresen, L. G. Hanson and M. Ravnborg, *The relationship between MRI and PET changes and cognitive disturbances in MS*, J Neurol Sci, **245**, 99-102 (2006).

- K. Nielsen, E. Rostrup, J. L. Frederiksen, S. Knudsen, H. K. Mathiesen, L. G. Hanson and O. B. Paulson, *Magnetic Resonance Imaging at 3.0 Tesla Detects More Lesions in Acute Optic Neuritis Than at 1.5 Tesla*, *Invest Radiol*, **41**, 76-82 (2006).
- L. G. Hanson, T. E. Lund and C. G. Hanson, *Encoding of electrophysiology and other signals in MR images*, *J Magn Reson Imag*, **25**, 1059-66 (2007). <http://www.drcomr.dk:8080/18/>.
- L. G. Hanson, *A graphical simulator for teaching basic and advanced MRI techniques*, *RadioGraphics*, **27**(6):e27, 2007. Software available at <http://www.drcomr.dk/bloch>.
- L. G. Hanson, *Is Quantum Mechanics necessary for understanding Magnetic Resonance?* Concepts in Magn Reson, **32A**(5), 329-40 (2008). <http://www.drcomr.dk:8080/22/>.
- R. de Nijs, M. J. Miranda, L. K. Hansen and L. G. Hanson, *Motion correction of Single Voxel Spectroscopy by Independent Component Analysis applied to spectra from non-anesthetized pediatric subjects*, *Magn Reson Med*, **62**, 1147-1154 (2009).
- C. í Dali, L. G. Hanson, N. Barton, J. Fogh, N. Nair and A. M. Lund, *Brain N-acetylaspartate levels correlate with motor function in metachromatic leukodystrophy*, *Neurology*, *in press*, 2010.

Patents

- L. G. Hanson, T. E. Lund and C. G. Hanson, *Encoding and transmission of signals as RF signals for detection using an MR apparatus*, PCT/DK2005/000343, WO/2005/116676 (pending), 2005.

Longer conference papers

- L. G. Hanson and P. Lambropoulos, *Wave packet dynamics in two-electron atoms; Influence of a strongly driven core resonance*, NATO ASI Series: Proceedings of SILAP IV (1995), Kluwer Academic Publishers, Amsterdam.
- P. Willendrup, C. Svarer, L. G. Hanson and O. B. Paulson, *A simple approach to combined inhomogeneity correction and tissue segmentation*, in "Brain imaging using PET", In: Senda M, Kimura Y, Herscovitch P (eds). Brain imaging using PET, Academic Press, 159-62 (2002)..
- R. Engholm, A. Dubinskiy, R. Larsen, L. G. Hanson and B. Christoffersen, Proceedings of the SPIE, **6144**, 1228-38 (2006).

Unrefereed publications

- L. G. Hanson, J. Zhang and P. Lambropoulos, *Comment on "Observation of Continuum-Continuum Autler-Townes Splitting"*, *Phys Rev Lett*, **77**(1), 202 (1996).
- L. G. Hanson, *MR-skanning: Billeder fra den forbudte side af bølgelængdegrænsen*, GAMMA – Tidsskrift for fysik **143**, p. 8-26, 2006. <http://www.drcomr.dk:8080/21/>.
- L. G. Hanson, *Bloch simulator and viewer*, Educational software for illustrating basic phenomena involved in magnetic resonance imaging. <http://www.drcomr.dk/bloch>, 2007
- L. G. Hanson, *Introduktion til teknikken bag MR-skanning*, Introduction to MRI in Danish, <http://www.drcomr.dk/Intro.pdf>, 44 pages, revised 2009.
- L. G. Hanson, *Introduction to Magnetic Resonance Imaging Techniques*, Educational material for technical and non-technical students, <http://www.drcomr.dk:8080/37/>, translation by Theis Groth, 48 pages, 2009.
- J. E. Wilhjelm, J. Henriksen and L. G. Hanson, *En MR-skanner man kan lege med*, MTI - Medicinsk Teknologi og Informatik, **6**, p. 10-12, 2009.
- L. G. Hanson, *MR-skanning ved 7 tesla feltstyrke etableres i Danmark*, MTI – Medicinsk Teknologi&Informatik, *in press*, 2010.

Abstracts (single page contributions to conference proceedings)

- L. G. Hanson, S. Topp and O. B. Paulson, *Correction for B_1 inhomogeneity using EPI-based field maps*, in "Proc. of the ISMRM 6th Annual Meeting", 128 (1998)
- L. G. Hanson and O. B. Paulson, *Segmented Spectroscopy: A flexible alternative to single voxel methods*, in "Proc. of the ISMRM 6th Annual Meeting", p. 363 (1998)
- L. G. Hanson, K. Schaumburg and O. B. Paulson, *A reconstruction strategy for echo planar spectroscopy*, in "Proc. of the ISMRM 7th Annual Meeting", p. 682, 1999.
- E. Adalsteinsson, L. G. Hanson, C. H. Meyer and D. M. Spielman, *Incorporation of T_2 measurements in volumetric CSI*, in "Proc. of the ISMRM 7th Annual Meeting", 250, 1999.
- L. G. Hanson, *Lipid containment achieved for echo planar spectroscopic imaging by modulation of the readout-gradient envelope*, in "Proc. of the ISMRM 8th Annual Meeting", 373, 2000.
- A. P. Born, T. E. Lund, L. G. Hanson, A. Steensgaard, P. L. Madsen, E. Rostrup, and H. C. Lou, *Negative visually induced BOLD response during human adult slow-wave sleep*, in "Proc. of the ISMRM 8th Annual Meeting", 498, 2000.
- T. E. Lund and L. G. Hanson, *Physiological noise reduction in fMRI using vessel time series as covariates in a general linear model*, in "Proc. of the ISMRM 9th Annual Meeting", 22, 2001.
- L. G. Hanson, J. Marstrand and E. Rostrup, *Use of training data for improved model-free estimation of the impulse response in dynamic MRI*, in "Proc. of the ISMRM 9th Annual Meeting", 1583, 2001.
- L. G. Hanson, E. Kalowska and E. Rostrup, *Improving perfusion quantification in stroke by principal component filtering*, "Proc. of the ISMRM 10th Annual Meeting", 1086, 2002.
- I. K. Andersen, S. Rosenbaum, K. Sidaros, L. G. Hanson and H. B. W. Larsson, *Improved Brain Perfusion Quantification using a Saturation Recovery Sequence*, "Proc. of the ISMRM 10th Annual Meeting", 590, 2002.
- L. G. Hanson and T. Dyrby, *RF inhomogeneity correction: Validity of the smooth-bias approximation*, "Proc. of the ISMRM 10th Annual Meeting", 2316, 2002.
- A. Skimminge, K. Markenroth, L. G. Hanson, *Improved spectroscopy using cluster analysis and lipid signals as a motion indicator*, "Proc. of the ISMRM 11th Annual Meeting", 269, 2002.
- H. K. Mathiesen, T. Tscherning, P. S. Sørensen, O. B. Paulson and L. G. Hanson, *Multi-slice echo planar spectroscopic imaging in multiple sclerosis*, "Proc. of the ISMRM 11th Annual Meeting", 2519, 2003.
- I. K. Andersen, S. Rosenbaum, K. Sidaros, L. G. Hanson and H. B. W. Larsson, *T1 Based Brain Perfusion Quantification*, "Proc. of the ISMRM 11th Annual Meeting", 2197, 2003.
- M. J. Miranda, L. C. Sørensen, A. P. Born, A.-M. Leffers, B. Peitersen and L. G. Hanson, *Multi-slice echo planar MR spectroscopic imaging (EPSI) in premature infants at term-equivalent age*, "Proc. of the ISMRM 11th Annual Meeting", 2107, 2003.
- H. K. Mathiesen, T. Tscherning, P. S. Sørensen, O. B. Paulson and L. G. Hanson, *Multi-slice echo planar spectroscopic imaging measures pathology in cerebral cortex in multiple sclerosis*, "Proc. of the ISMRM 12th Annual Meeting", 530, 2004.
- E. Rostrup, M. Liptrott, K. Nielsen and L. G. Hanson, *Anisotropy of the BOLD Response*, "Proc. of the ISMRM 12th Annual Meeting", 1022, 2004.
- T. Stavngaard, L. V. Sjøgaard, L. G. Hanson and J. Mortensen, *Comparison of hyperpolarized ^3He MR imaging and Krypton scintigraphy in healthy volunteers and COPD patients*, "Proc. of the ISMRM 12th Annual Meeting", 1672, 2004.
- K. Sidaros, I. K. Andersen and L. G. Hanson, *Accurate B_1 -insensitive fast T_1 -measurements at 3T*, "Proc. of the ISMRM 13th Annual Meeting", 2188, 2005.

- L. G. Hanson, T. E. Lund and C. G. Hanson, The MFAMOUS technique: Electrophysiological signal recording by MR image acquisition, "Proc. of the ISMRM 13th Annual Meeting", 1526, 2005.
- L. G. Hanson, H. Lund and E. Rostrup, Efficient multi-dimensional diffusion measurements at 3 Tesla, "Proc. of the ISMRM 13th Annual Meeting", 1298, 2005.
- K. Nielsen, E. Rostrup, J. L. Frederiksen, S. Knudsen, H. K. Mathiesen, L. G. Hanson, O. B. Paulson, Magnetic resonance imaging at 3.0 tesla detects more lesions in acute optic neuritis than at 1.5 tesla, "Proc. of the ISMRM 13th Annual Meeting", 1051, 2005.
- H. K. Mathiesen, T. Tscherning, A. Jønsson, J. Andresen, P. S. Sørensen, M. Blinkenberg, E. Rostrup, O. B. Paulson, L. G. Hanson, Global NAA/Cr measured by multi-slice echo planar spectroscopic imaging correlates with cognitive impairment in multiple sclerosis, "Proc. of the ISMRM 13th Annual Meeting", 1054, 2005.
- L. G. Hanson, T. E. Lund, C. G. Hanson, The MFAMOUS technique: Electrophysiological signal recording by MR image acquisition *Neuroimage* 2005, 26(1), 810, 2005.
- C. G. Hanson, L. G. Hanson, A multi-frequency amplitude modulator for encoding electrical signals in MR images, "Proc. of the ISMRM 14th Annual Meeting", 2388, 2006.
- L. G. Hanson, A. Skimminge, C. G. Hanson, Strategies for avoiding image artefacts when scanner is used for recording of non-MR signals, "Proc. of the ISMRM 14th Annual Meeting", 2389, 2006.
- L. G. Hanson, A. Skimminge, C. G. Hanson, Encoding of EEG in MR images, "Proc. of the ISMRM 15th Annual Meeting", 1958, 2007.
- L. G. Hanson, A. Skimminge, C. G. Hanson, Minimalist EEG-recording for improving fMRI. "Proc. of the ISMRM 16th Annual Meeting", 2427, 2008.
- L. G. Hanson, C. í Dali, J. Fogh, Multi-slice spectroscopic imaging of late infantile metachromatic leukodystrophy, "Proc. of the ISMRM 16th Annual Meeting", 2066, 2008.
- L. G. Hanson, H. Lund, I. K. Mikkelsen, Estimation of perfusion and other vascular parameters from first part of bolus passage. "Proc. of the ISMRM 17th Annual Meeting", 1470, 2009.
- C. í Dali, L. G. Hanson, J. Fogh, A. M. Lund, Multi-slice proton MRSI and clinical outcome in children with late infantile Metachromatic Leukodystrophy (MLD). "Proc. of the ISMRM 17th Annual Meeting", 1170, 2009.
- X. Wu, L. G. Hanson, M. Blinkenberg, A. Skimminge, P. S. Sørensen, O. B. Paulson and H. K. Mathiesen. Cortical N-acetyl aspartate predicts long-term clinical disability in multiple sclerosis – a longitudinal MR spectroscopic imaging study. "Proc. of the ISMRM 18th Annual Meeting", 4330, 2010.