Assaf Tal **Jan. 22, 2013**

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Education

Ph.D. Physics, Weizmann Institute of Science (awarded March 2009): *The Acquisition of Spatially Encoded Signals in Magnetic Resonance Spectroscopy and Imaging*, under the supervision of Prof. Lucio Frydman. The main focus of my Ph.D. in experimental and computational physics was the development of new algorithms and acquisition schemes for magnetic resonance imaging (MRI) in the presence of highly inhomogeneous fields, and for the fast acquisition of two-dimensional nuclear magnetic resonance (NMR) spectra.

M.Sc. Physics, Weizmann Institute of Science (awarded January 2004): *The Generation and Quantification of Entanglement in Quantum Information*, under the supervision of Prof. Gershon Kurizki. My M.Sc. in theoretical physics examined the possibility of producing entanglement, the most basic resource in quantum information processing, using particle collisions.

B.Sc. Physics, Hebrew University, Jerusalem (awarded 2001), Cum Laude

Employment

Post-doctoral Fellow at the NYU Langone School of Medicine, April 2010 - Present
My current research in the lab of Prof. Oded Gonen focuses on the development of new pulse sequences and methods for in-vivo magnetic resonance spectroscopy of the human brain, in healthy volunteers and in patients with either multiple sclerosis or traumatic brain injury. I am also working on the development of spectroscopic sequences for high-field (7T) clinical scanners.

Lecturer: Weizmann Institute of Science, November 2009 - February 2010
I've taught an MRI Primer course to chemists at the Weizmann Institute, alongside Prof. Lucio Frydman. Voted outstanding lecturer.

Teaching Assistant: Weizmann Institute of Science, 2008.
I was a Teaching Assistant in the graduate course on NMR Spectroscopy for Chemists and Biologists given by Prof. Lucio Frydman. Voted outstanding teaching assistant.

List of Publications

1. W. Wu, I. Kirov, **A. Tal**, J. S. Babb, S. Milla, J. Oved, H. L. Weiner, O. Devinsky, O. Gonen, *Brain MR Spectroscopic Abnormalities in "MRI-Negative" Tuberous Sclerosis Complex Patients*, Epilepsy and Behavior (In Press, 2013)
2. I. Kirov, **A. Tal**, J. S. Babb, J. Reaume, T. Bushnik, T. A. Ashman, S. Flanagan, R. I. Grossman, O. Gonen, *Proton MR spectroscopy correlates diffuse axonal abnormalities with post-concussive symptoms in mild traumatic brain injury*, in press (DOI:10.1089/neu.2012.2696) J. Neurotrauma (2013)
3. II Kirov, **A. Tal**, JS Babb, YW Lui, RI Grossman, O. Gonen, *Diffuse axonal injury in mild traumatic brain injury: a 3D multivoxel MR spectroscopy study*, in press (DOI: 10.1007/s00415-012-6626-z), J. Neurol 260:242-252 (2013)
4. II Kirov, **A. Tal**, JS Babb, J. Herbert, O. Gonen, *Serial proton MR spectroscopy of gray and white matter in relapsing-remitting multiple sclerosis*, Neurology 80(1):39-46 (2013)
5. **A. Tal**, O. Gonen, *Localization Errors in MR Spectroscopic Imaging due to the Drift of the Main Magnetic Field and their Correction*, in press (DOI: 10.1002/mrm.24531), Magn. Res. Med. (2012)

6. WE Wu, **A. Tal**, II Kirov, H. Rusinek, JS Babb, EM Ratai, RG Gonzalez, O. Gonen, *Global Gray and White Matter Metabolic Changes following SIV-Infection in CD8-Depleted Rhesus Macaques: Proton MR Spectroscopic Imaging at 3T*, in press, NMR in Biomed. (2012)
7. **A. Tal**, G. Goelman, O. Gonen, *In-vivo FID-Detection with 3D Multivoxel Longitudinal Hadamard Spectroscopic Imaging in the Human Brain at 3 T*, in press (DOI: 10.1002/mrm.24327), Magn. Res. Med. (2012)
8. **A. Tal**, I. Kirov, RI Grossman, O. Gonen, *The Role of Gray and White Matter Segmentation in Quantitative Proton MR Spectroscopic Imaging*, NMR Biomed. 25(12):1392-1400 (2012)
9. O. Cohen, **A. Tal**, G. Goelman, O. Gonen, *Non-spin-Echo 3D Transverse Hadamard Encoded Proton Spectroscopic Imaging in the Human Brain*, in press (DOI: 10.1002/mrm.24464), Magn. Reson. Med (2012)
10. C. Hardy, **A. Tal**, JS Babb, NN Perry, J. Messinger, D. Antonius, D. Malaspina, O. Gonen, *Multivoxel Proton MR Spectroscopy Used to Distinguish Anterior Cingulate Metabolic Abnormalities in Patients with Schizophrenia*, Radiology 261:542-550 (2011).
11. **A. Tal**, B. Shapira and L. Frydman, *Method and Apparatus for the Acquisition of High Definition Images in Inhomogeneous Environments*, Registered Patent, (2007).
12. **A. Tal,** L. Frydman, *Single Scan Multidimensional Magnetic Resonance*, Prog. Mag. Res. Spec. 57(3):241-292, (2010).
13. Y. Shrot, **A. Tal (Equal Contributor)** and L. Frydman, *New developments in the spatial encoding of spin interactions for single-scan 2D NMR*, J. Mag. Res. in Chem. 47(5):415-22 (2009)
14. **A. Tal**, B. Shapira and L. Frydman, *Single-Scan 2D Hadamard NMR Spectroscopy*, Angewandte Chemie 48(15): 2732-6 (2009)
15. **A. Tal** and L. Frydman, *Spectroscopic imaging from spatially-encoded single-scan multidimensional MRI data*, J. Mag. Res. 189 (1): 46-58 (2007)
16. **A. Tal** and L. Frydman, *Spatial encoding and the single-scan acquisition of high definition MR images in inhomogeneous fields*, J. Mag. Res. 182 (2): 179-194 (2006)
17. L. Fisch, **A. Tal** and G. Kurizki, *Translational entanglement by collisions and half-collisions*, Int. J. Mod. Phys. B 20 (11-13):1648-1660 (2006)
18. **A. Tal**, B Shapira and L. Frydman, *A continuous phase-modulated approach to spatial encoding in ultrafast 2D NMR spectroscopy*, J. Mag. Res 176(1): 107-114 (2005)
19. L. Fisch, **A. Tal** and G. Kurizki, *Translational entanglement and teleportation of matter wavepackets by collisions and half-collisions*, Int. J. Mod. Phys. B 19 (26):3897-3921 (2005)
20. **A. Tal** and G. Kurizki, *Translational entanglement via collisions: How much quantum information is obtainable?*, Physical Review Letters 94 (160503) (2005)

Awards and Funding

Human Frontiers Science Foundation Cross Disciplinary Fellowship, 2010-2012 ($167,322)
Clore-Israel Foundation Scholar for Excellence in PhD Research, 2006-2009 ($60,000)
Wolf prize for academic achievements during B.Sc., 2003 (1000 NIS)
Amos De-Shalit Ulpana for Physics, 2002 (1000 NIS)

Honors and Awards

Reviewer for *Journal of Magnetic Resonance*
Reviewer for *Magnetic Resonance in Medicine*
Reviewer for *Magnetic Resonance Materials in Physics, Biology and Medicine*
Member of the International Society for Magnetic Resonance in Medicine (ISMRM)
Voted outstanding lecturer by students in MRI Primer course, 2010.
Voted outstanding teaching assistant by students attending NMR graduate course, 2008
Journal of Magnetic Resonance cover paper, November 2008
Invited lecture, 3rd Polish-Israeli NMR Workshop, 2007
Invited lecture, Annual Meeting of the Israeli Magnetic Resonance Society, 2007