

Curriculum Vitae

Date Prepared: 06/30/14
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Place of Birth: Israel

Education

1999-2003		The Adi Lautman Interdisciplinary Program for Outstanding Students	Tel Aviv University, Israel
2002-2004	M.Sc. Summa Cum Laude	School of Computer Science (Dr. Nir Sochen)	Tel Aviv University, Israel
2004-2009	Ph.D.	School of Computer Science (Dr. Nathan Intrator and Dr. Nir Sochen)	Tel Aviv University, Israel

Postdoctoral Training

2009-2011	Postdoctoral Fellow	Psychiatry Neuroimaging Laboratory & Laboratory of Mathematics in Imaging (Dr. Martha Shenton and Dr. Carl-Fredrik Westin)	Harvard Medical School
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Faculty Academic Appointments

2011-2014	Instructor	Psychiatry	Harvard Medical School
2014	Assistant Professor	Psychiatry and Radiology	Harvard Medical School

Appointments at Hospitals/Affiliated Institutions

2009-2011	Research Fellow	Psychiatry	Brigham and Women's
2011-	Research Associate	Psychiatry	Brigham and Women's

Major Administrative Leadership Positions

Local			
2014	Director, Neuroscience Image Computing	Psychiatry Neuroimaging Laboratory, Brigham and Women's Hospital, Harvard Medical School	

Other Professional Positions

2003	Research Assistant	Tel Aviv University
2003-2008	MRI Technologist	Tel Aviv Sourasky Medical Center, Israel
2004-2009	MR Applications Programmer	Tel Aviv University, Israel
2005-2007	Brain Imaging Applications Programmer	Tel Aviv Sourasky Medical Center, Israel
2005-2008	Guest Researcher in Prof. Peter Basser's Lab	NICHHD/NIH, Bethesda, MD
2013	Consultant	Hockey concussion Education Project (HCEP), Canada
2014	Consultant	Laboratory for Rehabilitation Neuroscience, University of Florida.
2014	Consultant	Laureate Institute for Brain Research

Professional Societies

2004-	International Society for Magnetic Resonance in Imaging	Member
2005	Neuronal Information Processing Systems Foundation	Student Member, Volunteer
2008, 2011	Organization for Human Brain Mapping	Member
2008	Medical Image Computing and Computer Assisted Interventions Society	Student Member
2012	Schizophrenia International Research Society	Member

Editorial Activities

Ad hoc Reviewer

Neuroimage, Hippocampus, Journal of the Neurological Sciences, Information Sciences, Psychiatry research: Neuroimaging, American Journal of Psychiatry, Journal of Magnetic Resonance Imaging, Magnetic Resonance in Medicine, Medical Image Analysis, International Journal of Biomedical Imaging, Schizophrenia Research, JAMA Psychiatry, Human brain Mapping, Journal of Neuroscience. MICCAI, ACCV, ISMRM

Other Editorial Roles

2012-	Review Editor	Frontiers in Brain Imaging Methods
2012-	Program Committee	Computational Diffusion MRI Workshop at MICCAI

Honors and Prizes

1999-2004	The Adi Lautman Scholarship	Tel Aviv University Interdisciplinary Program for Outstanding Students	(To cover 100% of tuition in these years)
2002-2008	The Levi-Gitter- Edersheim Scholarship	The Adams Super Center for Brain Studies, Tel Aviv University	(To cover 100% of tuition and additional funds for salary)
2004	Excellence in Studies Award	School of Computer Science, Tel Aviv University	
2004, 2007, 2008	The Deutsch Travel Award	School of Computer Science, Tel Aviv University	
2004, 2005, 2008	Student Travel Award	International Society for Magnetic Resonance in Medicine	
2006	Best Publication of the Year in Neuroscience	The Adams Super Center for Brain Studies, Tel Aviv University	
2007	Travel Award	The Adams Super Center for Brain Studies, Tel Aviv University	
2008	The Constantiner Travel Scholarship	Tel Aviv University	
2009	Katzir-Katchelsky Travel Fellowship	Weizmann Institute of Science	
2009	The <i>Fulbright</i> Post- Doctoral Fellowship	United States-Israel Educational Foundation	(To partially cover salary)
2012	The <i>NARSAD</i> Young Investigator Award	Brain and Behavior Foundation	(To partially cover salary)
2013	ISMARM Merit Award	Magna cum Laude	

Report of Funded and Unfunded Projects

Funding Information

Past

- 2009-2010 Fulbright (**Pasternak, \$20,000**)
Novel diffusion MRI analysis methods for quantifying brain disorders.
Applying a novel Bio-geometrical approach for diffusion modeling is aimed at providing biological relevant quantities from diffusion MRI measurements.
Role: Principal Investigator
- 2009-2010 Distinguished Investigator Award (Shenton)
A Novel Application of DFMRI to Schizophrenia: A more robust measure of brain activation.
The goal is to develop Diffusion-weighted Functional Magnetic Resonance Imaging, to evaluate neuronal activity.
Role: Post-doc
- 2009-2010 NIH R01 MH 050740 (Shenton)
Computerized Image Analyses of MR Scans in Schizophrenia.
The goal of this grant is to localize further brain abnormalities in patients afflicted with schizophrenia.
Role: Post-doc

Current

- 2009-2017 NIH R01 MH074794 (Westin)
Novel Diffusion MRI Analyses of White Matter in Schizophrenia.
The objective of this project is to develop and apply novel Diffusion Magnetic Resonance Imaging analysis methods, in order to detect and localize white matter brain abnormalities in schizophrenia
Role: Investigator
- 2011-2014 W81XWH-08-2-0159 (Shenton, Kikinis, Rosen)
Department of Defense
Neuroimaging leadership core for the Injury and Traumatic Stress (INTRuST) consortium.
The main goal is to establish imaging sequences at each of the consortium sites, and to perform the post processing of images to provide dependent measures of interest based on hypotheses determined by the clinical consortium.
Role: Investigator
- 2011-2014 W81XWH-07-CC-CS-DoD (subaward PI: Shenton. Overall PI: Eisenberg)
Department of Defense
A randomized clinical trial of Glyburide (RP-1127) for TBI.
The main goal of this sub award is to design the imaging protocol and develop algorithms for the imaging component of this study.
Role: Investigator

- 2011-2014 W81XWH-07-CC-CS-DoD (subaward PI: Shenton. Overall PI: Duncan)
 Department of Defense
 Brain indices of risk for post traumatic stress disorder after mild traumatic brain injury.
 The main goal is to design the imaging protocol and overseeing the processing of all images for the research study.
 Role: Investigator
- 2012-2014 NIH RO1 MH090291 (Goldstein)
 Fetal Hormonal Programming of Sex Differences in Aging of the Memory Circuitry.
 The goal of this administrative supplement is to extend the aims of the original grant regarding the impact of fetal risk on white matter pathology and associations with memory decline.
 Role: Investigator
- 2013-2015 NARSAD Young Investigator Award (**Pasternak, \$60,000**)
 Brain and Behavior Foundation
 Free-water as a novel imaging biomarker for the investigation of inflammation and degeneration dynamics in schizophrenia.
 The aim of this project is to test the utility of a novel imaging biomarker in characterizing the relation between degenerative and inflammatory processes, as they are manifested in schizophrenia.
 Role: Principal Investigator
- 2013-2018 NIH 2P41 EB015902-16 (Kikinis)
 Neuroimaging Analysis Center.
 The Neuroimage Analysis Center (NAC) is a National Resource Center in the Biomedical Technology Resource Center (BTRC) program that is developing image analysis algorithms and software tools to improve understanding of brain diseases and to enable innovative treatments.
 Role: Investigator
- 2013-2018 NIH 1R01 AG042512 (Kubicki, Makris, Rosene)
 Neural substrates of diffusion imaging in cognitively aging Rhesus monkeys.
 The objective of this project is to establish anatomical specificity of diffusion MRI by determining the histopathological bases of imaging measures and their relationship to cognitive aging.
 Role: Investigator
- 2013-2015 NIH U01 NS083223-01A1 (Westin)
 Characterization of White Matter in Huntington's Disease Using Diffusion MRI.
 The long term goal of this project is to use advanced diffusion imaging methods to detect subtle white matter degeneration in Huntington's disease and to predict its future course, before symptoms can be seen clinically.
 Role: Investigator
- 2014-2018 VA Merit (Shenton)
 Development of MR Biomarkers of Brain Injury in Acute and Chronic mTBI
 The goal of this project is to develop objective radiological markers for the diagnosis of mTBI using advanced multimodal neuroimaging techniques

Current Unfunded Projects

- 2010- Pilot study of the association of free-water and Multiple Sclerosis in lesions and non-affected gray matter. (PI)
- 2011- Pilot study of free-water measures as precursors of dementia in mild cognitively impaired subjects. (PI)

Report of Local Teaching and Training

Teaching of Students in Courses

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|-----------|------------------------------------------------------------|--------------------------------------------------------------------|
| 2005-2009 | Programming for Engineers
1st year Engineering students | Tel Aviv University, Israel
2-hr session per week, for 12 weeks |
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Laboratory and Other Research Supervisory and Training Responsibilities

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| 2012- | Supervision of two Research Assistants involved in the Glyburide project (W81XWH-07-CC-CS-DoD) | Weekly meetings and daily mentorship |
| 2013- | Mentoring a senior honors thesis of a Boston University undergraduate student | Weekly meetings and daily mentorship |
| 2014- | Mentoring summer students. | Weekly meetings and daily mentorship |

Formally Supervised Trainees

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| 2011 | Klaus Fritzsche, PhD. / Research Associate, German Cancer Research Institute, Heidelberg, Germany.
Was trained as a post-doc under my supervision. Published three conference proceedings, one book chapter, and one journal paper |
| 2011-2012 | Daniel McCaffrey MA / CEO, Ib-Lieve
A research assistant under my direct supervision. Published one abstract |

Local Invited Presentations

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| 2005 | DT-MRI Partial Volume Effects Reduction using the Multiple Tensor Variational Framework / Invited Speaker
Eight Israeli Symposium on Computer-Aided Surgery, Medical Robotics, and Medical Imaging (ISRACAS)
Rabin Medical Center, Petach Tikva, Israel. |
| 2009 | Diffusion Imaging of Complex Brain Architecture / Genetics and Schizophrenia Seminar
Department of Psychiatry, BWH |
| 2010 | Free-Water Imaging of the Human Brain / Surgical Brain Mapping Laboratory
Department of Neurosurgery, BWH |

- 2011 Free-Water abnormalities in Mild Traumatic Brain Injuries / Surgical Brain Mapping Laboratory
Department of Neurosurgery, BWH
- 2012 Excessive Extracellular Volume Contributes to White Matter Abnormalities in the Early Stage of Schizophrenia / Psychiatry Neuroimaging Laboratory
Department of Psychiatry, BWH
- 2012 Free-Water Imaging for the Estimation of Extracellular Volume in the Human Brain / BrainMap Seminar, Martinos Center for Biomedical Imaging, MGH
- 2012 Free-Water Imaging for the Estimation of Extracellular Volume in the Human Brain / Fetal-Neonatal Neuroimaging & Developmental Science Center (FNNDSC) Seminar Series, Children's Hospital
- 2012 Estimation Approaches of a Free-Water Compartment in the Human Brain / Computational Radiology Laboratory, Children's hospital

Report of Regional, National and International Invited Teaching and Presentations

Invited Presentations and Courses

Those presentations below sponsored by outside entities are so noted and the sponsor(s) is (are) identified.

Regional

- 2010 Free-Water Imaging of the Human Brain / Visualization Research Lab
Brown University, Providence, RI
- 2013 Diffusion MRI – Mapping Brain Architecture by following water molecules / Social Computing Group, Media lab, MIT, Cambridge, MA

National

- 2010 Current Problems in Diffusion MRI Data Analysis (Sponsor: Section on Tissue Biophysics and Biomimetics, NIH) / Invited Speaker
Section on Tissue Biophysics and Biomimetics
National Institutes of Health, Bethesda, MD
- 2013 Application of Free-Water Imaging for the Study of Brain Disorders (Sponsor: Gruss Magnetic Resonance Research Center) / Invited Speaker
Gruss Magnetic Resonance Research Center
Albert Einstein College of Medicine, Bronx, NY
- 2014 Microstructural Alterations in Brain Disorders Revealed by Free-Water Imaging / Invited Speaker
Center for Imaging of Neurodegenerative Diseases
San Francisco Veterans Affairs Medical Center, University of California, San Francisco, CA

International

- 2004 Variational Method for the Separation of Multiple Tensor Orientations / Invited Speaker
Visualization and Image Processing of Tensor Fields Workshop.
Dagstuhl, Germany
- 2009 Free-Water Elimination and Mapping from DWI (Sponsor: Laboratory for Mathematics in
Imaging, BWH) / Invited Speaker
Laboratory for Mathematics in Imaging
Department of Radiology, BWH (While holding a position in Tel Aviv University)
- 2009 Why do Tensors Swell? / Invited Speaker
New Developments in the Visualization and Processing of Tensor Fields Workshop.
Dagstuhl, Germany
- 2010 Computational Challenges in the Reconstruction of Neuronal Fibers by Tractography
(Sponsor: Institute for Numerical and Applied Mathematics, University of Göttingen)
/ Invited Plenary Talk
Workshop on Novel Reconstruction Strategies in NMR and MRI.
Göttingen, Germany
- 2011 Free-Water Volume Abnormalities Modulate Brain Connectivity Measures in First
Episode Schizophrenia Patients / Invited Speaker
MRI of Brain Microstructure and Connectivity Meeting.
Tel Aviv, Israel.
- 2011 Estimation of Free-Water Corrected Diffusion Tensors / Invited Speaker
Visualization and Processing of Tensors and Higher Order Descriptors for Multi-Valued
Data Workshop.
Dagstuhl, Germany
- 2013 Variational Approach for the Estimation of Biological Compartments from
Diffusion MRI (Sponsor: Linköping University) / Invited Speaker
Department of Medical Technology (IMT), Linköping University.
Linköping, Sweden.
- 2013 Double-PFG Filtered Diffusion Tensors (Sponsors: Marcus Wallenberg Foundation; CR
development) / Invited Speaker
Towards increasing the specificity of diffusion MRI A Marcus Wallenberg Symposium.
Jukkasjarvi IceHotel, Sweden
- 2014 Diffusion Tensors from Double-PFG MRI Experiments / Invited Speaker
Visualization and Processing of Higher Order Descriptors for Multi-Valued Data
Workshop.
Dagstuhl, Germany
- 2014 Diffusion Bio Markers and Brain Structure / Invited Speaker
Multi-dimensional Diffusion MRI Workshop
Rimforsa, Sweden

Report of Scholarship

Peer reviewed publications in print or other media

Peer Reviewed Research Investigations

1. **Pasternak O**, Sochen N, Intrator N, Assaf Y. Neuronal fiber delineation in area of edema from diffusion weighted MRI. In: Proceeding of The Nineteenth Annual Conference on Neural Information Processing Systems (NIPS); Vancouver, Canada. 2005. 704; p. 1075-1080.
2. Schonberg T, Pianka P, Hendler T, **Pasternak O**, Assaf Y. Characterization of displaced white matter by brain tumors using combined DTI and fMRI. *Neuroimage*. 2006; 30:1100-1111.
3. Gur Y, **Pasternak O**, Sochen N. Regularization of diffusion tensor MRI via local coordinates. In: Sixth International Congress on Industrial Applied Mathematics (ICIAM); Zurich, Switzerland 2007; 7(1); p. 1011211-1011212.
4. **Pasternak O**, Sochen N, Intrator N, Assaf Y. Variational multiple-tensors fitting of fiber-ambiguous DW-MRI voxels. *Magnetic Resonance Imaging*. 2008; 26:1133-1144.
5. **Pasternak O**, Verma R, Sochen N, Basser PJ. On what manifold do diffusion tensors live? In: Proceeding of Manifold Learning in Medical Imaging workshop at MICCAI; New-York City, New-York, USA. 2008. p. 1-8.
6. Assaf Y, **Pasternak O**. Diffusion tensor imaging (DTI)-based white matter mapping in brain research: a review. *Journal of Molecular Neuroscience*. 2008; 34(1):51-61.
7. Stein D, Neufeld A, **Pasternak O**, Graif M, Patish H, Schwimmer E, Ziv E, Assaf Y. Diffusion tensor imaging of the median nerve in healthy and Carpal tunnel syndrome subjects. *Journal of Magnetic Resonance Imaging*. 2009; 29(3):657-662.
8. Mezer A, Yovel Y, **Pasternak O**, Gorfine T, Assaf Y. Cluster analysis of resting-state fMRI time series. *Neuroimage*. 2009; 45(4):1117-1125.
9. Gur Y, **Pasternak O**, Sochen N. Fast GL(n) invariant framework for tensors regularization. *International Journal of Computer Vision*. 2009; 85(3):211-222.
10. **Pasternak O**, Sochen N, Gur Y, Intrator N, Assaf Y. Mapping and eliminating free water from diffusion weighted images. *Magnetic Resonance in Medicine*. 2009; 62(3):717-730.
11. Sasson E, Doniger GM, **Pasternak O**, Assaf Y. Structural correlates of memory performance with diffusion tensor imaging. *Neuroimage*. 2010; 50(3):1231-1242.
12. **Pasternak O**, Sochen N, Basser PJ. The effect of metric selection on the analysis of diffusion tensor MRI data. *Neuroimage*. 2010; 49(3):2190-2204.
13. Blumenfeld-Katzir T, **Pasternak O**, Dagan M, Assaf Y. Diffusion MRI of Structural brain plasticity induced by a learning and memory task. *PLoS ONE*. 2011; 6(6):e20678.
14. Metzler-Baddeley C., O'Sullivan MJ, Bells S, **Pasternak O**, Jones DK. How and how not to correct for CSF-contamination in diffusion MRI. *Neuroimage*, 2012; 59(2):1394-1403.

15. Sasson E, Doniger GM, **Pasternak O**, Tarrasch R, Assaf Y. Structural correlates of cognitive domains in normal aging with diffusion tensor imaging. *Brain Structure and Function*. 2012; 217(2):503-515.
16. Baumgartner C, Michailovich O, Levitt J, **Pasternak O**, Bouix S, Westin C-F, Rathi Y. A unified tractography framework for comparing diffusion models on clinical scans. In: *Proceeding of Medical Image Computing and Computer Assisted Interventions (MICCAI) Workshop on Computational Diffusion MRI (CDMRI)*; Nice, France, 2012. p. 1-8.
17. Koerte IK, Kaufmann D, Hartl E, Bouix S, **Pasternak O**, Kubicki M, Rauscher A, Li DK, Dadachanji SB, Taunton JA, Forwell LA, Johnson AM, Echlin PS, Shenton ME. A prospective study of physician-observed concussion during a varsity university hockey season: white matter integrity in ice hockey players. Part 2 of 4. *Neurosurgical Focus*. 2012; 33(6):E3.
18. **Pasternak O**, Shenton ME, Westin C-F. Estimation of extracellular volume from regularized multi-shell diffusion MRI. In: *Medical image computing and computer Assisted Intervention (MICCAI), Part II LNCS*; 2012. 7511: 305–312.
19. **Pasternak O**, Westin C-F, Bouix S, Seidman LJ, Goldstein JM, Woo TU, Petryshen TL, Meshulam-Gately RI, McCarley RW, Kikinis R, Shenton ME, Kubicki M. Excessive extracellular volume reveals a neurodegenerative pattern in schizophrenia onset. *Journal of Neuroscience*. 2012; 32(48): 17365-17372.
20. Shenton ME, Hamoda HM, Schneiderman JS, Bouix S, **Pasternak O**, Rathi Y, Vu MA, Purohit MP, Helmer K, Koerte I, Lin AP, Westin C-F, Kikinis R, Kubicki M, Stern RA, Zafonte R. A review of magnetic resonance imaging and diffusion tensor imaging findings in mild traumatic brain injury. *Brain Imaging and Behavior*. 2012; 6(2):137-192
21. Sasson E, Doniger GM, **Pasternak O**, Tarrasch R, Assaf Y. White matter correlates of cognitive domains in normal aging with diffusion tensor imaging. *Frontiers in Brain Imaging Methods*. 2013; 7(32):1-13.
22. **Pasternak O***, Bouix S*, Rathi Y, Pelavin PE, Zafonte R, Shenton ME. Increased gray matter diffusion anisotropy in patients with persistent post-concussive symptoms following mild traumatic brain injury. *PLoS ONE*. 2013; 8(6):e66205.
*These authors contributed equally to this work
23. Sasaki T, **Pasternak O**, Mayinger M, Muehlmann M, Savadjiev P, Bouix S, Kubicki M, Fredman E, Dahlben B, Helmer K, Johnson AM, Holmes JD, Forwell LA, Skopelja E, Shenton ME, Echlin P, Koerte IK. Changes in white matter microstructure in ice hockey players with a history of concussion: a diffusion tensor imaging study. *Journal of Neurosurgery*, 2014; 120(4):882-890.
24. Helmer K, **Pasternak O**, Fredman E, Preciado R, Koerte IK, Sasaki T, Mayinger M, Johnson AM, Holmes JD, Forwell LA, Skopelja E, Shenton ME, Echlin P. Susceptibility-Weighted Imaging Study in Male and Female Ice Hockey Players Over a Single Season. *Journal of Neurosurgery*, 2014; 120(4):864-872.
25. **Pasternak O**, Koerte IK, Bouix S, Fredman E, Sasaki T, Mayinger M, Helmer K, Johnson AM, Holmes JD, Forwell LA, Skopelja E, Shenton ME, Echlin P. Microstructural White Matter Alterations in Acutely Concussed Ice Hockey Players – A Longitudinal Free-Water MRI Study. *Journal of Neurosurgery*, 2014; 120(4):873-881.

26. Clemm von Hohenberg C, **Pasternak O**, Kubicki M, Ballinger T, Vu M-A, Swisher T, Green K, Giwerc M, Dahlben B, Goldstein JM, Woo T-UW, Petryshen TL, Mesholam-Gately RI, Woodberry KA, Thermenos HW, Mulert C, McCarley RW, Seidman LJ, Shenton ME. White matter microstructure in individuals at clinical high risk of psychosis: a whole-brain diffusion tensor imaging study. *Schizophrenia Bulletin*, (accepted)
27. Rathi Y, **Pasternak O**, Savadjiev P, Michailovich O, Bouix S, Kubicki M, Westin C-F, Makris N, Shenton ME. Gray matter alterations in early aging: A diffusion magnetic resonance imaging study. *Human Brain Mapping*, (accepted)
28. Maier-Hein KH, Westin C-F, Shenton ME, Weiner MW, Raj A, Thomann P, Kikinis R, Stieltjes B, **Pasternak O**. Widespread white matter degeneration preceding the onset of dementia. *Alzheimer's & Dementia*, (accepted)
29. Fletcher E, Carmichael O, **Pasternak O**, Maier-Hein KH, DeCarli C. Early brain loss in circuits affected by Alzheimer's disease is predicted by fornix microstructure but may be independent of gray matter. *Frontiers in Aging Neuroscience*, (accepted)
30. Ng TSC, Lin AP, Koerte IK, **Pasternak O**, Liao H, Merugumala S, Bouix S, Shenton ME. Neuroimaging in repetitive brain trauma. *Alzheimer's Research and Therapy*, (accepted).

Peer Reviewed Book Chapters

1. **Pasternak O**, Sochen N, Assaf Y. PDE based estimation and regularization of multiple diffusion tensor fields. In "Visualization and image processing of tensor fields", Eds. Weickert J, Hagen H. Springer, Berlin, 2006.
2. Gur Y, **Pasternak O**, Sochen N. SPD tensors regularization via Iwasawa decomposition. In "Mathematical methods for signal and image analysis and representation", Eds. Florac L, Duits R, Jongbloed G, van Lieshout M, Davies L. Springer, London, 2012.
3. **Pasternak O**, Sochen N, Basser P. Metric selection and diffusion tensor swelling. In "New developments in the visualization and processing of tensor fields", Eds. Laidlaw D, Vilanova A, Springer, Berlin, 2012.
4. Kubicki M, Westin C-F, **Pasternak O**, Shenton M. Diffusion tensor imaging and its application to schizophrenia and related disorders. In "Diffusion MRI – From quantitative measurement to in vivo neuroanatomy", Eds. Johansen-Berg H, Behrens T, 2nd edition, Academic Press, in press.
5. **Pasternak O**, Fritzsche K, Baumgartner C, Shenton M, Rathi Y, Westin C-F. The estimation of free-water corrected diffusion tensors. In "Visualization and Processing of Tensors and Higher Order Descriptors for Multi-Valued Data", Eds. Westin C-F, Vilanova A, Burgeth B, Springer, Berlin, in press.

PhD Thesis

Feature Extraction from Diffusion MRI of Complex Brain Architecture
 Ofer Pasternak
 Tel Aviv University, 2009.

Abstracts, Poster Presentations and Exhibits Presented at Professional Meetings

Peer Reviewed Abstracts (last 3 years)

1. **Pasternak O.**, Sochen N., Assaf Y. Separation of White Matter Fascicles from Diffusion MRI using Φ -Functional Regularization. In: Proceeding of the 12th International Society for Magnetic Resonance in Medicine meeting (ISMRM). Kyoto, Japan. 2004. p. 1227.
2. **Pasternak O.**, Sochen N., Assaf Y. Can CSF and Edema Contamination be Removed from 6 Directions DTI? In: International Society for Magnetic Resonance in Medicine Workshop on methods for quantitative diffusion MRI of human brain. Alberta, Canada. 2005.
3. **Pasternak O.**, Sochen N., Assaf Y. CSF Partial Volume Reduction in Hydrocephalus using a Variational Framework. In: Proceeding of the 13th International Society for Magnetic Resonance in Medicine meeting (ISMRM). Miami, USA. 2005. p. 1100.
4. Sasson E., Doniger G.M., **Pasternak O.**, Assaf Y. Age Related Cognitive Decline and Regional Brain Changes Studies by Diffusion MRI. In: Proceeding of the 15th International Society for Magnetic Resonance in Medicine meeting (ISMRM). Berlin, Germany, 2007. p. 77.
5. **Pasternak O.**, Sochen N., Intrator N., Assaf Y. Variational Framework for the Separation of Partially Volumed Tensor Compartments in the Human Brain. In: Proceeding of the 15th International Society for Magnetic Resonance in Medicine meeting (ISMRM): Berlin, Germany, 2007. p. 1601.
6. Blumenfeld-Katzir T., **Pasternak O.**, Assaf Y. Characterization of Age Induced Brain Changes using MRI in Rats. In: Proceeding of the 15th International Society for Magnetic Resonance in Medicine meeting (ISMRM): Berlin, Germany, 2007. p. 2360.
7. **Pasternak O.**, Lifshitz S., Assaf Y. From Tractography to Graph Tracking. In: Proceeding of the 15th International Society for Magnetic Resonance in Medicine meeting (ISMRM): Berlin, Germany, 2007. p. 3515.
8. **Pasternak O.**, Sochen N., Intrator N., Assaf Y. Free water Extraction from Diffusion Images. In: Proceeding of the 16th International Society for Magnetic Resonance in Medicine meeting (ISMRM): Toronto, Canada, 2008. p. 138.
9. **Pasternak O.**, Sochen N., Basse P.J. Metric Selection and Variability Maps for Diffusion Tensor Data. In: *Proceeding of the 17th International Society for Magnetic Resonance in Medicine meeting (ISMRM)*: p. 3580, Hawaii, USA, 2009
10. The Effect of Metric Selection on Averaging Diffusion Tensors – When and Why do Tensors Swell?
O. Pasternak, N. Sochen, P. Bassar
Proceeding of the 18th International Society for Magnetic Resonance in Medicine meeting (ISMRM): p. 1590, Stockholm, Sweeden, 2010
11. **Pasternak O.**, Westin C-F, Bouix S, Shenton ME, Kubicki M. Free water modulation of white matter integrity measures – with application to schizophrenia. In: Proceeding of the 19th International Society for Magnetic Resonance in Medicine meeting (ISMRM); Montreal, Canada. 2011. p. 2544.

12. Bells S, Deoni S, **Pasternak O**, Jones DK. Partial volume corrections of myelin water fraction values. In: Proceeding of the 19th International Society for Magnetic Resonance in Medicine meeting (ISMRM); Montreal, Canada. 2011. p. 4622.
13. Bells S, Deoni S, Cercignani M, **Pasternak O**, Jones DK. Asymmetry in multi-modal white matter microstructural indices. In: Proceeding of the 19th International Society for Magnetic Resonance in Medicine meeting (ISMRM); Montreal, Canada. 2011. p. 2000,
14. Bells S, Cercignani M, Deoni S, Assaf Y, **Pasternak O**, Evens J, Leemans A, Jones DK. “Tractometry” – Comprehensive multi-modal quantitative assessment of white matter along specific tracts. In: Proceeding of the 19th International Society for Magnetic Resonance in Medicine meeting (ISMRM); Montreal, Canada. 2011. p. 678.
15. **Pasternak O**, Bouix S, Kubicki M, Pelavin P, Schneiderman J, Zafonte RD, Shenton ME. Diffusion imaging reveals two spatially separable mechanisms in mild TBI. In: *3rd Federal Interagency Conference on TBI*; Washington, DC, USA. 2011.
16. **Pasternak O**, Kubicki M, Pelavin P, Zafonte RD, Shenton ME, Bouix S. Identification of neuroinflammation in mild traumatic brain injuries using a free-water atlas, In: *Proceedings of the 17th meeting of the Organisation for Human Brain Mapping (HBM)*; Quebec city, Canada, 2011.
17. **Pasternak O**, Rathi Y, Shenton ME, Westin C-F. Estimation of the angle between crossing fibers as a novel structural quantity. In: Proceeding of the 20th International Society for Magnetic Resonance in Medicine meeting (ISMRM); Melbourne, Australia. 2012. p. 1915.
18. Fritzsche K, Stieltjes B, van Bruggen T, Meinzer H-P, Westin C-F, **Pasternak O**. A combined approach for the elimination of partial volume effects in diffusion MRI. In: Proceeding of the 20th International Society for Magnetic Resonance in Medicine meeting (ISMRM); Melbourne, Australia. 2012. p. 3548.
19. Westin C-F, Nilsson M, **Pasternak O**, Topgaard D, Knutsson H. In-vivo angular double-PFG MRI of the human brain. In: Proceeding of the 20th International Society for Magnetic Resonance in Medicine meeting (ISMRM); Melbourne, Australia. 2012. p. 462.
20. Westin C-F, **Pasternak O**, Knutsson H. Rotationally invariant gradient schemes for diffusion MRI. In: Proceeding of the 20th International Society for Magnetic Resonance in Medicine meeting (ISMRM); Melbourne, Australia. 2012. p. 3537.
21. McCaffrey D., Ballinger T., Guttman C., Shenton M., Assaf Y., Kubicki M., **Pasternak O**. Inflammation and Degeneration Dynamics in Multiple Sclerosis, Myself Harvard Research Day, Psychiatry Annual Meeting, 2012
22. Baumgartner C, **Pasternak O**, Bouix S, Westin C-F, Rathi Y. Filtered multi-tensor tractography using free water estimation. In: Proceeding of the 20th International Society for Magnetic Resonance in Medicine meeting (ISMRM); Melbourne, Australia, 2012. p. 1904.
23. **Pasternak O**, Westin C-F, Bouix S, Seidman L, Goldstein J, Woo T, Petryshen T, Mesholam-Gately R, McCarley R, Kikinis R, Shenton M, Kubicki M. Global white matter inflammation pattern in first-episode schizophrenia – a free-water MRI study, In: International Congress on Schizophrenia Research; Florida, USA, 2013.

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25. Fritzsche K, Westin C-F, Meinzer H-P, Stieltjes B, **Pasternak O**. Free-water correction reveals wide spread differences between stable and converting MCI subjects. In: Proceeding of the 21th International Society for Magnetic Resonance in Medicine meeting (ISMRM); Salt-Lake City, UT, USA. 2013. p. 614. **** ISMRM Merit Award - Magna cum laude**
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Narrative Report

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My work concentrates on developing and applying novel MRI methodologies to study brain disorders. I am an Assistant Professor in Psychiatry and Radiology, Brigham and Women's Hospital, Harvard Medical School. I am the director of Neuroscience Image Computing at the Psychiatry Neuroimaging Lab (director Dr. Shenton) and the Laboratory of Mathematics in Imaging (Department of Radiology, director Dr. Westin). I am a computer scientist by training, yet my work is fundamentally interdisciplinary and is presented regularly in medical imaging, neuroscience, and applied mathematics venues.

I study the involvement of neuroinflammation in the early onset of brain disorders, where chronic neuroinflammation may trigger neuronal damage and the resulting cascade of cognitive or functional decline. My main contribution to this field is the development of free-water imaging (*MRM*, 2009), providing means to distinguish between neuroinflammatory related water accumulations and degeneration related tissue damage. In addition, I have developed algorithms for other MRI technologies, such as multi-shell imaging and double-PFG. My research achievements are reflected in publications and recognized by awards and funded grants. For example, I have demonstrated the involvement of neuroinflammation in the early stages of schizophrenia (*J. Neuroscience*, 2012) and was awarded the NARSAD young investigator award to look further into when inflammation first appears in the etiology of schizophrenia.

During my Fulbright postdoctoral fellowship, and in my work at Harvard Medical School, I have acquired expertise in the design and implementation of large multi-site imaging studies. I am part of the Injury and Traumatic Stress (INTRuST) consortium neuroimaging core, and several other multi-site projects, where the free-water measures have been included as endpoints. Currently I am involved in a large number of on-going projects studying neuroinflammation in various brain disorders such as Alzheimer's disease, Huntington's disease and head injuries. In the future I am planning to expand these studies by including other modalities such as PET and microscopy. My goal is to recognize neuroinflammation as a common mechanism that is shared by different brain disorders, which might be the basis for the development of new clinical treatments and/or preventive actions.

I highly value teaching as the main instrument of knowledge transfer responsible for the continuation of science across generations of scientists. I have previously taught undergraduate classes both as the primary lecturer, and as a teaching assistant. While at Harvard Medical School, I have interacted with many PIs, investigators, technicians and students across the country and overseas with many of these interactions involving my teaching both informally in invited presentations and in supervising students in their research. For example, part of my role in INTRuST is teaching members of each participating site on how to use our study protocol. In addition, I have had the opportunity to supervise and to mentor a postdoctoral researcher as well as a number of research assistants, and to manage work teams consisting of other investigators.

I am confident that my interdisciplinary background, my recognized research achievements, and my teaching experience constitute a solid foundation to support my efforts to contribute to the scientific knowledge.