IMAN AGANJ

Assistant Professor of Radiology, **Harvard Medical School**
Assistant in Neuroscience, Martinos Center for Biomedical Imaging, **Massachusetts General Hospital**
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Education

09/2005 – 12/2010	**Ph.D.** in *Electrical Engineering* (minor in *Computer Science*), **University of Minnesota**, Minneapolis, MN, USA. **M.S.** received in 2008. Research Assistant of Prof. Guillermo Sapiro.
04/2003 – 06/2005	**B.S.**, *Computer Science*, **École Polytechnique**, Paris, France.
09/2001 – 02/2003	*Electrical Engineering*, **Sharif University of Technology**, Tehran, Iran.
06/2000 – 06/2001	*Physics*, preparation program for International Physics Olympiad, **Young Scholars Club**, Tehran, Iran.

Work Experience

04/2016 – present	Assistant Professor of Radiology at **Harvard Medical School**, Boston, MA, USA.
09/2017 – present	Research Affiliate at the Computer Science and Artificial Intelligence Laboratory, **Massachusetts Institute of Technology**, Cambridge, MA, USA.
12/2013 – present	Assistant in Neuroscience at the Athinoula A. Martinos Center for Biomedical Imaging, **Massachusetts General Hospital**, Boston, MA, USA.
12/2013 – 03/2016	Instructor (junior faculty) in Radiology at **Harvard Medical School**, Boston, MA, USA.
02/2011 – 12/2013	Postdoctoral Research Fellow at the **Massachusetts General Hospital** (Athinoula A. Martinos Center for Biomedical Imaging, with Prof. Bruce Fischl), Radiology Department, **Harvard Medical School**, and Research Affiliate at the Department of Electrical Engineering and Computer Science (LIDS, with Prof. Devavrat Shah), **Massachusetts Institute of Technology**, Boston, MA, USA.
09/2005 – 12/2010	Research Assistant at the Image Sciences Laboratory of Prof. Guillermo Sapiro, Department of Electrical and Computer Engineering, **University of Minnesota**, Minneapolis, MN, USA.
Summer 2010	Internship at the Center for Magnetic Resonance Research (with Prof. Noam Harel), **University of Minnesota**, Minneapolis, MN, USA.
July 2009	Visiting the Odyssée Project Team (Prof. Rachid Deriche), Institut National de Recherche en Informatique et en Automatique (**INRIA**), Sophia Antipolis, France.
Summer 2008	Visiting Centre d'Enregistrement et de Recherche en Technologies de l'Information et Systèmes (CERTIS, Prof. Renaud Kériven), **École Nationale des Ponts et Chaussées**, Paris, France.
July 2007	Visiting the Laboratory of Neuro Imaging (Prof. Paul Thompson), **University of California – Los Angeles**, CA, USA.
Summer 2006	Internship at the Laboratory of Cell Biology (with Prof. Sriram Subramaniam), National Cancer Institute, **National Institutes of Health**, Bethesda, MD, USA.
Spring 2005	Internship at the Image Sciences Laboratory of Prof. Guillermo Sapiro, Department of Electrical and Computer Engineering, **University of Minnesota**, Minneapolis, MN, USA.
07/2001 – 06/2002	Teaching physics in the preparation program for the International Physics Olympiad, **Young Scholars Club**, Tehran, Iran.

Languages

Fluent: *English*, *French*; Native: *Persian*; Intermediate: *Spanish, Arabic*.

Awards and Honors

2016	GPU Grant (hardware gift), **NVIDIA Corporation**.
2016	Alzheimer's Disease Research Award ($300,000 of direct costs over three years), **BrightFocus Foundation**.
2016	**Microsoft Azure** Research Award ($20,000 of Azure credit for one year).
2015	Mentored Research Scientist Development (K01) Award ($738,500 of direct costs over five years), **National Institutes of Health** / National Institute of Diabetes and Digestive and Kidney Diseases.
2015	**JDRF** Career Development Award ($681,814 of direct costs over five years). This award was declined due to overlap with the above NIH K01 grant.
2014	Neurodegenerative Diseases Pilot Study Grant ($40,000 of direct costs for one year), **Harvard NeuroDiscovery Center**, **Massachusetts Alzheimer's Disease Research Center (ADRC)**, and **MGH Neurological Clinical Research Institute**.
2014	Educational Stipend, Joint Annual Meeting **ISMRM**-ESMRMB, Milan, Italy.
2013	First-author MRM'10 article was recognized at the **International Society for Magnetic Resonance in Medicine (ISMRM**) Award Ceremony by President Thomas Grist as one of the Top 5 Cited *Magnetic Resonance in Medicine* Papers from 2010.
2003 – 2005	Eiffel Excellence Scholarship, **École Polytechnique**, Paris, France.
2001	Silver medal of the **International Physics Olympiad**, Antalya, Turkey.
2000	Gold medal of the **National Physics Olympiad**, Tehran, Iran.

Publications

Journal Papers

I. Aganj and B. Fischl, "Multimodal image registration through simultaneous segmentation," *IEEE Signal Processing Letters*, vol. 24, no. 11, pp. 1661–1665, 2017.

H. Wang, C. Magnain, R. Wang, J. Dubb, A. Varjabedian, L. S. Tirrell, A. Stevens, J. C. Augustinack, E. Konukoglu, **I. Aganj**, M. P. Frosch, J. D. Schmahmann, B. Fischl, and D. A. Boas, "as-PSOCT: volumetric microscopic imaging of human brain architecture and connectivity," *NeuroImage*, in press, 2017.

T. Tong, **I. Aganj**, T. Ge, J. R. Polimeni, and B. Fischl, "Functional density and edge maps: characterizing functional architecture in individuals and improving cross-subject registration," *NeuroImage*, vol. 158, pp. 346–355, 2017.

I. Aganj, J. E. Iglesias, M. Reuter, M. R. Sabuncu, and B. Fischl, "Mid-space-independent deformable image registration," *NeuroImage*, vol. 152, pp. 158–170, 2017.

A. Gholipour, O. Afacan, **I. Aganj**, B. Scherrer, S. P. Prabhu, M. Sahin, and S. K. Warfield, "Super-resolution reconstruction in frequency, image, and wavelet domains to reduce through-plane partial voluming in MRI," *Medical Physics*, vol. 42, pp. 6919–6932, 2015.

J. L. Gaglia, M. Harisinghani, **I. Aganj**, G. R. Wojtkiewicz, S. Hedgire, C. Benoist, D. Mathis, and R. Weissleder, "Noninvasive mapping of pancreatic inflammation in recent-onset type-1 diabetes patients," *Proceedings of the National Academy of Sciences*, vol. 112, pp. 2139–2144, 2015.

I. Aganj, M. Reuter, M. R. Sabuncu, and B. Fischl, "Avoiding symmetry-breaking spatial non-uniformity in deformable image registration via a quasi-volume-preserving constraint," *NeuroImage*, vol. 106, pp. 238–251, 2015.

J. E. Iglesias, M. R. Sabuncu, **I. Aganj**, P. Bhatt, C. Casillas, D. Salat, A. Boxer, B. Fischl, and K. Van Leemput, "An algorithm for optimal fusion of atlases with different labeling protocols," *NeuroImage*, vol. 106, pp. 451–463, 2015.

G. Prasad, S. Joshi, N. Jahanshad, J. Villalon, **I. Aganj**, C. Lenglet, G. Sapiro, K. McMahon, G. de Zubicaray, N. Martin, M. Wright, A. Toga., and P. Thompson, "Automatic clustering and population analysis of white matter tracts using maximum density paths," *NeuroImage*, vol. 97, pp. 284–295, 2014.

I. Aganj, B. T. T. Yeo, M. R. Sabuncu, and B. Fischl, "On removing interpolation and resampling artifacts in rigid image registration," *IEEE Transactions on Image Processing*, vol. 22, no. 2, pp. 816–827, 2013.

E. Caruyer, **I. Aganj**, C. Lenglet, G. Sapiro, and R. Deriche, "Motion detection in diffusion MRI via online ODF estimation," *International Journal of Biomedical Imaging*, vol. 2013, Article ID 849363, 2013.

I. Aganj, C. Lenglet, E. Yacoub, G. Sapiro, and N. Harel, "A 3D wavelet fusion approach for the reconstruction of isotropic-resolution MR images from orthogonal anisotropic-resolution scans," *Magnetic Resonance in Medicine*, vol. 67, no. 4, pp. 1167–1172, 2012.

I. Aganj, C. Lenglet, N. Jahanshad, E. Yacoub, N. Harel, P. Thompson, and G. Sapiro, "A Hough transform global probabilistic approach to multiple-subject diffusion MRI tractography," *Medical Image Analysis*, vol. 15, no. 4, pp. 414–425, 2011.

I. Aganj, C. Lenglet, G. Sapiro, E. Yacoub, K. Ugurbil, and N. Harel, "Reconstruction of the orientation distribution function in single and multiple shell q-ball imaging within constant solid angle," *Magnetic Resonance in Medicine*, vol. 64, no. 2, pp. 554–566, 2010.

I. Aganj, G. Sapiro, N. Parikshak, S. K. Madsen, and P. Thompson, "Measurement of cortical thickness from MRI by minimum line integrals on soft-classified tissue," *Human Brain Mapping*, vol. 30, no. 10, pp. 3188–3199, 2009.

R. Narasimha, **I. Aganj**, A. Bennett, M. Borgnia, D. Zabransky, G. Sapiro, S. McLaughlin, J. Milne, and S. Subramaniam, "Evaluation of denoising algorithms for biological electron tomography," *Journal of Structural Biology*, vol. 164, no. 1, pp. 7–17, 2008.

Book Chapter

I. Aganj, G. Sapiro, and N. Harel, "Q-space modeling in diffusion-weighted MRI," in *Brain Mapping: An Encyclopedic Reference*, A. W. Toga, Ed., Waltham: Academic Press, 2015, pp. 257–263.

Conference Papers

S. Koley, C. Chakraborty, C. Mainero, B. Fischl, and **I. Aganj**, "A fast approach to automatic detection of brain lesions," in *Proc. MICCAI Brain Lesions Workshop*, pp. 52–61, Athens, Greece, 2016. (oral presentation)

Y. Zhang, **I. Aganj**, A. van der Kouwe, and M. D. Tisdall, "Effects of resolution and registration algorithm on the accuracy of EPI vNavs for real time head motion correction in MRI," in *Proc. 7th International Workshop on Biomedical Image Registration (held in conjunction with IEEE CVPR)*, pp. 583–591, Las Vegas, NV, 2016.

I. Aganj, J. E. Iglesias, M. Reuter, M. R. Sabuncu, and B. Fischl, "Mid-space-independent symmetric data term for pairwise deformable image registration," in *Proc. 18th International Conference on Medical Image Computing and Computer Assisted Intervention*, pp. 263–271, Munich, Germany, 2015.

I. Aganj, M. Reuter, M. R. Sabuncu, and B. Fischl, "Symmetric non-rigid image registration via an adaptive quasi-volume-preserving constraint," in *Proc. 10th IEEE International Symposium on Biomedical Imaging*, pp. 234–237, San Francisco, CA, 2013.

A. Kamath, **I. Aganj**, J. G. Xu, E. Yacoub, K. Ugurbil, G. Sapiro, and C. Lenglet, "Generalized constant solid angle ODF and optimal acquisition protocol for fiber orientation mapping," in *Proc. MICCAI Workshop on Computational Diffusion MRI*, pp. 67–78, Nice, France, 2012.

G. Prasad, S. Joshi, N. Jahanshad, J. Villalon, **I. Aganj**, C. Lenglet, G. Sapiro, K. McMahon, G. de Zubicaray, N. Martin, M. Wright, A. Toga, and P. Thompson, "White matter tract analysis in 454 adults using maximum density paths," in *Proc. MICCAI Workshop on Computational Diffusion MRI*, pp. 1–12, Toronto, Canada, 2011.

E. Caruyer, **I. Aganj**, C. Lenglet, G. Sapiro, and R. Deriche, "Online motion detection in high angular resolution diffusion imaging," in *Proc. 8th IEEE International Symposium on Biomedical Imaging*, pp. 516–519, Chicago, IL, 2011.

N. Jahanshad, **I. Aganj**, C. Lenglet, A. Joshi, Y. Jin, M. Barysheva, K. McMahon, G. de Zubicaray, N. Martin, M. Wright, A. Toga, G. Sapiro, and P. Thompson, "Sex differences in the human connectome: 4-Tesla high angular resolution diffusion imaging (HARDI) tractography in 234 young adult twins," in *Proc. 8th IEEE International Symposium on Biomedical Imaging*, pp. 939–943, Chicago, IL, 2011.

G. Prasad, N. Jahanshad, **I. Aganj**, C. Lenglet, G. Sapiro, A. Toga, and P. Thompson, "Atlas-based fiber clustering for multi-subject analysis of high angular resolution diffusion imaging tractography," in *Proc. 8th IEEE International Symposium on Biomedical Imaging*, pp. 276–280, Chicago, IL, 2011.

L. Zhan, A. Leow, **I. Aganj**, C. Lenglet, G. Sapiro, E. Yacoub, N. Harel, A. Toga, and P. Thompson, "Differential information content in staggered multiple shell HARDI measured by the tensor distribution function," in *Proc. 8th IEEE International Symposium on Biomedical Imaging*, pp. 305–309, Chicago, IL, 2011.

Y. Jin, Y. Shi, N. Jahanshad, **I. Aganj**, G. Sapiro, A. Toga, and P. Thompson, "3D elastic registration improves HARDI-derived fiber alignment and automated tract clustering," in *Proc. 8th IEEE International Symposium on Biomedical Imaging*, pp. 822–826, Chicago, IL, 2011.

I. Aganj, C. Lenglet, and G. Sapiro, "ODF maxima extraction in spherical harmonic representation via analytical search space reduction," in *Proc. 13th International Conference on Medical Image Computing and Computer Assisted Intervention*, pp. 84–91, Beijing, China, 2010.

E. Caruyer, **I. Aganj**, C. Lenglet, G. Sapiro, and R. Deriche, "Online orientation distribution function reconstruction in constant solid angle and its application to motion detection in HARDI," in *Proc. 7th IEEE International Symposium on Biomedical Imaging*, pp. 812–815, Rotterdam, Netherlands, 2010.

I. Aganj, C. Lenglet, G. Sapiro, E. Yacoub, K. Ugurbil, and N. Harel, "Multiple q-shell ODF reconstruction in q-ball imaging," in *Proc. 12th International Conference on Medical Image Computing and Computer Assisted Intervention*, pp. 423–431, London, UK, 2009.

I. Aganj, C. Lenglet, and G. Sapiro, "ODF reconstruction in q-ball imaging with solid angle consideration," in *Proc. 6th IEEE International Symposium on Biomedical Imaging*, pp. 1398–1401, Boston, MA, 2009. (oral presentation)

I. Aganj, G. Sapiro, N. Parikshak, S. K. Madsen, and P. Thompson, "Segmentation-free measurement of cortical thickness from MRI," in *Proc. of the 5th IEEE International Symposium on Biomedical Imaging*, pp. 1625–1628, Paris, France, 2008. (oral presentation)

D. Rother, K. Patwardhan, **I. Aganj**, and G. Sapiro, "3D priors for scene learning from a single view," in *Proc. IEEE Workshop on Search in 3D (held in conjunction with IEEE CVPR)*, pp. 1–8, Anchorage, AK, 2008.

I. Aganj, A. Bartesaghi, M. Borgnia, H.Y. Liao, G. Sapiro, and S. Subramaniam, "Regularization for inverting the Radon transform with wedge consideration," in *Proc. 4th IEEE International Symposium on Biomedical Imaging*, pp. 217–220, Arlington, VA, 2007. (oral presentation)

R. Narasimha, **I. Aganj**, M. Borgnia, G. Sapiro, S. McLaughlin, J. Milne, and S. Subramaniam, "From gigabytes to bytes: Automated denoising and feature identification in electron tomograms of intact bacterial cells," in *Proc. 4th IEEE International Symposium on Biomedical Imaging*, pp. 304–307, Arlington, VA, 2007.

Conference Abstracts

Y. Zhang, **I. Aganj**, A. van der Kouwe, and M. D. Tisdall, "Accurate high-speed 3D-registration of EPI vNavs for head motion correction," in *Proc. 25th Annual Meeting of the International Society for Magnetic Resonance in Medicine*, Honolulu, HI, 2017.

I. Aganj, G. Prasad, P. Srinivasan, A. Yendiki, P. M. Thompson, and B. Fischl, "Structural brain network augmentation via Kirchhoff's laws," in *Proc. Joint Annual Meeting of ISMRM-ESMRMB*, Milan, Italy, 2014.

A. Gholipour, O. Afacan, **I. Aganj**, and S. Warfield, "Super-resolution MRI reconstruction in image, frequency, and wavelet domains," in *Proc. Joint Annual Meeting of ISMRM-ESMRMB*, Milan, Italy, 2014.

G. Prasad, **I. Aganj**, and P. Thompson, "Synthesizing connectivity networks to improve classification of Alzheimer's disease," in *Proc. 43rd Annual Meeting of the Society for Neuroscience*, San Diego, CA, 2013.

A. Kamath, **I. Aganj**, J. Xu, E. Yacoub, K. Ugurbil, G. Sapiro, and C. Lenglet, "Optimal acquisition protocol for white matter fiber orientation mapping using generalized CSA-ODF reconstruction," in *Proc. 21st Annual Meeting of International Society for Magnetic Resonance in Medicine*, Salt Lake City, UT, 2013.

G. Prasad, S. Joshi, N. Jahanshad, J. Villalon, **I. Aganj**, C. Lenglet, G. Sapiro, K. McMahon, G. de Zubicaray, N. Martin, M. Wright, A. Toga, and P. Thompson, "Genetic analysis of fibers in white matter pathways from HARDI images," in *Proc. 18th Annual Meeting of the Organization for Human Brain Mapping*, Beijing, China, 2012.

I. Aganj, C. Lenglet, E. Yacoub, G. Sapiro, and N. Harel, "A wavelet fusion approach to the reconstruction of isotropic-resolution MR images from anisotropic orthogonal scans," in *Proc. 19th Annual Meeting of the International Society for Magnetic Resonance in Medicine*, Montréal, Canada, 2011.

N. Jahanshad, **I. Aganj**, C. Lenglet, G. Sapiro, A. Toga, K. McMahon, G. de Zubicaray, N. Martin, M. Wright, and P. Thompson, "4-Tesla high angular resolution diffusion tractography analysis of the human connectome in 234 subjects: Sex differences and EPI distortion effects," in *Proc. 19th Annual Meeting of the International Society for Magnetic Resonance in Medicine*, Montréal, Canada, 2011.

E. Caruyer, **I. Aganj**, C. Lenglet, G. Sapiro, and R. Deriche, "Online reconstruction and motion detection in HARDI," in *Proc. 19th Annual Meeting of International Society for Magnetic Resonance in Medicine*, Montréal, Canada, 2011.

S. N. Sotiropoulos, **I. Aganj**, S. Jbabdi, G. Sapiro, C. Lenglet, and T. E. Behrens, "Inference on constant solid angle orientation distribution functions from diffusion-weighted MRI," in *Proc. 17th Annual Meeting of the Organization for Human Brain Mapping*, Québec City, Canada, 2011.

G. Prasad, N. Jahanshad, **I. Aganj**, C. Lenglet, G. Sapiro, A. W. Toga, and P. M. Thompson, "Atlas-based fiber clustering for multi-subject HARDI tractography," in *Proc. 17th Annual Meeting of the Organization for Human Brain Mapping*, Québec City, Canada, 2011.

L. Zhan, J. J. GadElkarim, A. D. Leow, **I. Aganj**, C. Lenglet, G. Sapiro, N. Harel, A. W. Toga, and P. M. Thompson, "Probabilistic tractography using the tensor distribution function in multiple-shell HARDI," in *Proc. 17th Annual Meeting of the Organization for Human Brain Mapping*, Québec City, Canada, 2011.

I. Aganj, N. Jahanshad, C. Lenglet, A. W. Toga, K. L. McMahon, G. I. de Zubicaray, M. J. Wright, N. G. Martin, G. Sapiro, and P. Thompson, "Relating fiber crossing in HARDI to intellectual function," in *Proc. 16th Annual Meeting of the Organization for Human Brain Mapping*, Barcelona, Spain, 2010.

L. Zhan, A. D. Leow, **I. Aganj**, C. Lenglet, G. Sapiro, N. Harel, A. W. Toga, and P. Thompson, "Tensor distribution function in multiple shell high angular resolution diffusion imaging," in *Proc. 16th Annual Meeting of the Organization for Human Brain Mapping*, Barcelona, Spain, 2010.

I. Aganj, C. Lenglet, and G. Sapiro, "Accurate ODF reconstruction in q-ball imaging," in *Proc. 15th Annual Meeting of the Organization for Human Brain Mapping*, San Francisco, CA, 2009.

I. Aganj, C. Lenglet, G. Sapiro, M. C. Chiang, and P. Thompson, "Multi-subject diffusion MRI tractography via a Hough transform global approach," in *Proc. 15th Organization for Human Brain Mapping*, San Francisco, CA, 2009. (oral presentation)

I. Aganj, C. Lenglet, R. Keriven, G. Sapiro, N. Harel, and P. Thompson, "A Hough transform global approach to diffusion MRI tractography," in *Proc. 17th Annual Meeting of the International Society for Magnetic Resonance in Medicine*, Honolulu, HI, 2009. (oral presentation)