Mert R. Sabuncu

Assistant Professor
School of Electrical and Computer Engineering
Meinig School of Biomedical Engineering
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EDUCATION

Post-doc — **Massachusetts Institute of Technology**
Cambridge, MA — August 2006-October 2009
Medical Vision at
Computer Science and Artificial Intelligence Lab
Mentor: Polina Golland

PhD — **Princeton University**
Princeton, NJ — September 2001–July 2006
Electrical Engineering
Thesis Advisor: Peter J. Ramadge
Concentration: Information Sciences and Systems

MA — **Princeton University**
Princeton, NJ — September 2001–May 2003
Electrical Engineering

BSc — **Middle East Technical University**
Ankara, Turkey — September 1997–June 2001
Electrical and Electronics Engineering

RESEARCH INTERESTS

- Biomedical image analysis, with application focus in neurology/neuroscience
- Machine Learning, pattern recognition, multivariate statistics, Bayesian graphical models, approximate inference
- Data mining, applied to large-scale biomedical datasets, including genetics and imaging modalities
- Computational imaging genetics
- Image processing, computer vision

ACADEMIC EXPERIENCE

- **Assistant Professor** — July 2017-present
  School of Electrical and Computer Engineering
  Meinig School of Biomedical Engineering
  Cornell University

- **Visiting Assistant Professor** — July 2016-June 2017
  School of Electrical and Computer Engineering
  Cornell University

- **Assistant Professor of Radiology** — March 2012-June 2017

A.A. Martinos Center for Biomedical Imaging
Department of Radiology, Mass. General Hospital/Harvard Medical School

- **Research Affiliate, MIT CSAIL** March 2012- June 2017
- **Associated Scientist, Broad Institute of Harvard and MIT** December 2015- June 2017
- **Instructor, Assistant in Neuroscience, Research Faculty** November 2009-March 2012

A.A. Martinos Center for Biomedical Imaging
Department of Radiology, Mass. General Hospital/Harvard Medical School
(Research Affiliate, MIT CSAIL)

- **Post-doctoral Associate** August 2006-October 2009

CSAIL, Massachusetts Institute of Technology
(Member of Prof. Polina Golland's research group)

- **Graduate Research Assistant** June 2002-July 2006

Princeton University, Princeton, NJ

TEACHING EXPERIENCE

AT CORNELL

- **Instructor**

Cornell ECE

ECE 4250 Digital Signal and Image Processing Spring 2018

A senior-level course that focuses on developing a toolbox of techniques to process and analyze real-world signals, model them under uncertainty/noise, and make decisions about them. Highlights of the course include sampling, filtering, multirate signal processing, intro to statistical signal processing including Wiener and Kalman filtering, and the foundations of machine learning and computer vision. The course aims to include a broad range of applications including NLP, audio/music, imaging, and data analytics.

- **Instructor**

Cornell ECE/BME

ECE 5970/BME 5310 Machine Learning with Biomedical Data Fall 2017, 2018

Graduate-level course that provides a theoretical foundation for advanced machine learning methods applicable to the analysis of large-scale biomedical data. There is a team-based class project that involves writing Matlab or Python code to implement a machine learning solution for a biomedical prediction problem.

PRIOR TO CORNELL

- **Instructor**

3rd Biomedical Image Analysis Summer School: Modalities, Methodologies & Clinical Research
organized by
Center of Visual Computing of CentraleSupelec & INRIA, Saclay, Ile-de-France July 2015
Taught three-hour tutorial lecture on "image Segmentation."

- **Instructor**

Harvard Catalyst
Advanced Imaging in Clinical/Translational Neuroscience Research Course May 2015
Taught a one-hour lecture on "imaging genetics."

- **Visiting Professor**

Electrical Engineering Department, Bogazici University, Istanbul, Turkey

EE58M Modeling and Inference in Biomedical Image Analysis Summer 2012
Graduate-level class introducing concepts utilized in cutting edge applications where biomedical image data are analyzed. An array of probabilistic modeling and inference techniques are covered, with a focus on fundamental problems in biomedical image analysis, such as brain mapping, surgical planning and computer-aided diagnosis. Designed and developed the entire course material. Gave all lectures, prepared and graded assignments, projects, and exams.

- **Lecturer**

A.A. Martinos Center for Biomedical Imaging**,** Charlestown, MA

FreeSurfer Course 2010, 2011, 2012
Lecture on statistical methods that are available in the FreeSurfer software package.

- **Guest Lecturer**

Massachusetts Institute of Technology, Cambridge, MA

HST.583 Functional Magnetic Resonance Imaging Fall 2008, Fall 2010, Fall 2012, Fall 2015
Graduate-level multidisciplinary course that focuses on the conduct and interpretation of fMRI-based human brain mapping studies. Gave guest lectures on image registration and cortical surface-based analysis.

6.034 Artificial Intelligence Spring 2008
Basic undergraduate level course that introduces representations, techniques, and architectures used to build applied systems and to account for intelligence from a computational point of view. Gave a guest lecture that overviewed cutting-edge research in medical vision and image analysis.

- **Teaching Assistant**

Princeton University, Princeton, NJ

ELE 488 Image Processing and Transmission Fall 2003, Fall 2004, Fall 2005
Senior/graduate level course. Designed and supervised bi-weekly laboratory sessions, helped prepare and grade homework assignments, graded exams and conducted help sessions. Prepared, graded and supervised individual term projects where students were required to conduct original research. Received the 2006 ***Outstanding Teaching Assistant Award*** from the Department of Electrical Engineering.

ELE 391 The Wireless Revolution Spring 2005
A course, mainly designed for non-engineers, that addresses the different aspects of today's wireless technologies. Graded homework assignments, exams and term projects.

ELE 201 Introduction to Electrical Signals and Systems Fall 2002
A gateway class for the Electrical Engineering Department. Organized and supervised lab sessions, graded assignments and exams.

OTHER PROFESSIONAL EXPERIENCE

- **Chief Technology Advisor** June 2017-present
  Cleerly Med, Inc, New York, NY
- **Intern/Research Staff** June 2003-June 2006

Siemens Corporate Research, Princeton, NJ

- **Undergraduate Intern** August 2000

Tubitak-Bilten (The Scientific and Research Council of Turkey)

- **Undergraduate Intern** June-July 1999

Vestel Electronics, Inc., Manisa, Turkey

PUBLICATIONS

NCBI Bibliography:
http://www.ncbi.nlm.nih.gov/myncbi/browse/collection/42348358/?sort=date&direction=descending
Google Scholar Profile:
http://scholar.google.com/citations?user=Pig-I4QAAAAJ&hl=en

* Contributed equally

- **Journal**

J1. "Subspecialization within default mode nodes characterized in 10,000 UK Biobank participants." JM Kernbach, BTT Yeo, J Smallwood, DS Margulies, M Thiebaut de Schotten, H Walter, MR Sabuncu, AJ Holmes, A Gramfort, G Varoquaux, B Thirion, and D Bzdok. *Proceedings of the National Academy of Sciences,* 2018.

J2. "Medical Image Imputation from Image Collections." A Dalca, KL Bouman, WT Freeman, NS Rost, MR Sabuncu, and P Golland. *IEEE Transactions on Medical Imaging*. 2018.

J3. "The Shared Genetic Basis of Educational Attainment and Cerebral Cortical Morphology." T Ge, C-Y Chen, AE Doyle, R Vettermann, LJ Tuominen, DJ Holt, MR Sabuncu, and JW Smoller. "" *Cerebral Cortex*, 2018.

J4. "Spatial Topography of Individual-Specific Cortical Networks Predicts Human Cognition, Personality, and Emotion. " R Kong, J Li, C Orban, MR Sabuncu, H Liu, A Schaefer, N Sun, XN Zuo, AJ Holmes, SB Eickhoff, and BTT Yeo. *Cerebral Cortex*. 2018.

J5. "The human cortex possesses a reconfigurable dynamic network architecture that is disrupted in psychosis." JM Reinen, OY Chén, RM Hutchison, BTT Yeo, KM Anderson, MR Sabuncu, D Öngür, JL Roffman, JW Smoller, JT Baker, and AJ Holmes. *Nature Communications*, 9(1), p.1157,2018. PMCID: PMC5861099

J6. "Heritability analysis with repeat measurements and its application to resting-state functional connectivity." T Ge, AJ Holmes, RL Buckner, JW Smoller*, and MR Sabuncu*. *Proceedings of the National Academy of Sciences*, vol. 114, no. 21, 2017. PMCID: PMC5448225

J7. "Reply to Risk and Zhu: Mixed-effects modeling as a principled approach to heritability analysis with repeat measurements." T Ge, AJ Holmes, RL Buckner, JW Smoller, and MR Sabuncu. *Proceedings of the National Academy of Sciences*, *115*(2), pp.E123-E123. 2018.

J8. "Phenome-wide heritability analysis of the UK Biobank." T Ge, CY Chen, BM Neale, MR Sabuncu*, and JW Smoller*. *PLoS Genetics*, vol 13, no. 4, 2017. PMCID: PMC5400281

J9. "Tau and amyloid-β proteins distinctively associate to functional network changes in the aging brain." J Sepulcre, MR Sabuncu, Q Li, G El Fakhri, R Sperling, KA Johnson. *Alzheimer's & Dementia* 13, no. 11: 1261-1269, 2017.

J10. "Dissociable influences of APOE ε4 and polygenic risk of AD dementia on amyloid and cognition." T Ge, MR Sabuncu, JW Smoller, RA Sperling, and EC Mormino. *Neurology*, pp.10-1212, 2018.

J11. "Hierarchical organization of tau and amyloid deposits in the cerebral cortex." J Sepulcre, MJ Grothe, MR Sabuncu, J Chhatwal, AP Schultz, B Hanseeuw, G El Fakhri, R Sperling, and KA Johnson. *JAMA Neurology* 74.7 (2017): 813-820. PMCID: PMC5710537

J12. "Joint Analysis of Cortical Area and Thickness as a Replacement for the Analysis of the Volume of the Cerebral Cortex." AM Winkler, DN Greve, KJ Bjuland, TE Nichols, MR Sabuncu, AK Håberg, J Skranes, and LM Rimol. *Cerebral Cortex*, *28*(2), pp.738-749, 2017.

J13. "Diffeomorphic functional brain surface alignment: Functional demons." KH Nenning, H Liu, SS Ghosh, MR Sabuncu, E Schwartz, G Langs. *NeuroImage*. In Press, 2017.

J14. "Mid-space-independent deformable image registration." I Aganj, JE Iglesias, M Reuter, MR Sabuncu, and B Fischl. *NeuroImage,* vol. 152, 2017. PMCID: PMC473257

J15. "In vivo tau, amyloid, and gray matter profiles in the aging brain." J Sepulcre, AP Schultz, MR Sabuncu, T Gomez-Isla, J Chhatwal, A Becker, R Sperling, and KA Johnson. *Journal of Neuroscience*, vol. 36, no. 28, pp.7364-7374, 2016. PMID: 27413148

J16. "Morphometricity as a measure of the neuroanatomical signature of a trait," MR Sabuncu, T Ge, AJ Holmes, J Smoller, R Buckner, and B Fischl. *Proceedings of National Academy of Arts and Sciences (PNAS*), vol. 113, no. 39, E5749-E5756, 2016. PMID: 27613854

J17. "Multidimensional heritability of neuroanatomical shape." T Ge, M Reuter, AM Winkler, AJ Holmes, PH Lee, LS Tirrell, JL Roffman, RL Buckner, JW Smoller, and MR Sabuncu. *Nature Communications,* vol. 7, p. 13291, 2016. PMID: 27845344

J18. "Bayesian model reveals latent atrophy factors in Alzheimer's disease with dissociable preclinical and clinical trajectories." X Zhang, E Mormino, RA Sperling, MR Sabuncu, and BTT Yeo. *Proceedings of National Academy of Sciences (PNAS),* vol. 113, no. 42, p. E6535-E6544 , 2016. PMID: 27702899

J19. "Polygenic risk of Alzheimer's disease is associated with early and late life processes." E Mormino, RA Sperling, A Holmes, RL Buckner, PL DeJager, JW Smoller, and MR Sabuncu. *Neurology,* vol. 87, no. 5, p. 481-8. 2016. PMID: 27385740

J20. "Probabilistic Modeling of Imaging, Genetics and Diagnosis ", N Batmanghelich, A Dalca, G Quon, G., MR Sabuncu, and P Golland, *IEEE Transactions on Medical Imaging,* vol. 35, no. 7, p. 1765-79, 2016. PMID: 26886973

J21. "Multi-atlas Segmentation of Biomedical Images: A Survey". JE Iglesias and MR Sabuncu. *Medical Image Analysis*, vol. 24, no. 1, 2015. PMID: 26201875

J22. "Massively Expedited Genome-wide Heritability Analysis (MEGHA)." T Ge, TE Nichols, AJ Holmes, PH Lee, JL Roffman, RL Buckner, MR Sabuncu*, and JW Smoller*. *Proceedings of the National Academy of Sciences,* vol. 12, no. 8. 2015. PMCID: PMC4345618

J23. . "Identifying Shared Brain Networks in Individuals by Decoupling Functional and Anatomical Variability." G Langs, D Wang, P Golland, S Mueller, R Pan, MR Sabuncu, W Sun, K Li, and H Liu. *Cerebral Cortex*, bhv189, 2015. PMID: 26334050

J24. "A Kernel Machine Method for Detecting Effects of Interaction Between Multidimensional Variable Sets: An Imaging Genetics Application." T Ge, T Nichols, D Ghosh, E Mormino, JW Smoller*, and MR Sabuncu*. *NeuroImage*, vol. 109, 2015. PMCID: PMC4339421

J25. "An algorithm for optimal fusion of atlases with different labeling protocols." JE Iglesias, MR Sabuncu, I Aganj, P Bhatt, C Casillas, D Salat, A Boxer, B Fischl, and K Van Leemput. *Neuroimage*, vol. 106, 2015. PMCID: PMC4286284

J26. "Avoiding symmetry-breaking spatial non-uniformity in deformable image registration via a quasi-volume-preserving constraint." I Aganj, M Reuter, MR Sabuncu, and B Fischl. *Neuroimage*, vol. 106, 2015. PMCID: PMC4286290

J27. "Clinical Prediction from Structural Brain MRI Scans: A Large-Scale Empirical Study." MR Sabuncu, and E Konukoglu. *Neuroinformatics*: 1-16, 2014. PMCID: PMC4303550

J28. "Event Time Analysis of Longitudinal Neuroimage Data." MR Sabuncu, JL Bernal-Rusiel, M Reuter, DN Greve, and B Fischl. *Neuroimage*, vol. 97, 2014. PMCID: PMC4078261

J29. "Neurobiological basis of head motion in brain imaging." L-L Zeng, D Wang, MD Fox, MR Sabuncu, D Hu, M Ge, RL Buckner, and H Liu. *Proceedings of the National Academy of Sciences,* vol. 111, no. 16, 2014.

J30. "Genetic variation of oxidative phosphorylation genes in stroke and Alzheimer's disease." A Biffi, MR Sabuncu, RS Desikan, N Schmansky, DH Salat, J Rosand, and CD Anderson, *Neurobiology of Aging*, vol. 35, no. 8, 2014. PMCID: PMC4329419

J31. "A unified framework for cross-modality multi-atlas segmentation of brain MRI." EJ Iglesias, MR Sabuncu, and K Van Leemput. *Medical image analysis*, vol. 17, no. 8, 2013. PMCID: PMC3888218

J32. "In vivo characterization of the early states of the amyloid-beta network." J Sepulcre, MR Sabuncu, A Becker, R Sperling, and KA Johnson, *Brain,* vol. 136, nol. 7, 2239-2252, 2013. PMCID: PMC3692037

J33. "Improved Inference in Bayesian Segmentation Using Monte Carlo Sampling: Application to Hippocampal Subfield Volumetry." JE Iglesias, MR Sabuncu, and K Van Leemput, *Medical Image Analysis*, vol. 17, no. 7, p. 766-778, 2013. PMCID: PMC3719857

J34. "Spatiotemporal Linear Mixed Effects Modeling for the Mass-univariate Analysis of Longitudinal Neuroimage Data." JL Bernal-Rusiel, M Reuter, DN Greve, B Fischl, and MR Sabuncu, *Neuroimage*, vol. 81, p. 358-370, 2013. PMCID: PMC3816382

J35. "A Surface-based Analysis of Language Lateralization and Cortical Asymmetry." DN Greve, L Van der Haegen, Q Cai, S Stufflebeam, MR Sabuncu, B Fischl, and M Bysbaert, *Journal of Cognitive Neuroscience,* vol. 25, no. 9, 1477-1492, 2013. PMCID: PMC3767398

J36. "On Removing Interpolation and Resampling Artifacts in Rigid Image Registration." I Aganj, B Yeo, MR Sabuncu, and B Fischl, IEEE *Transactions on Image Processing*, vol. 22, no. 2, 816-827, 2013. PMCID: PMC3694571

J37. "Individual Variability in Functional Connectivity Architecture of the Human Brain." S Mueller, D Wang, MD Fox, BT Yeo, J Sepulcre, MR Sabuncu, R Shafee, J Lu, and H Liu, *Neuron,* vol. 77, no. 3, 586-595, 2013. PMCID: PMC3746075

J38. "Statistical Analysis of Longitudinal Neuroimage Data with Linear Mixed Effects Models." JL Bernal-Rusiel, DN Greve, M Reuter, B Fischl, and MR Sabuncu, *Neuroimage*, vol. 66, 249-260, 2012. PMCID: PMC3586747

J39. "The Relevance Voxel Machine (RVoxM): A Self-tuning Bayesian Model for Informative Image-based Prediction." MR Sabuncu and K Van Leemput, *IEEE Transactions on Medical Imaging*, vol. 31, no. 12, 2012. PMCID: PMC3623564

J40. "Stepwise Connectivity of the Modal Cortex Reveals the Multimodal Organization of the Human Brain." J Sepulcre, MR Sabuncu, BTT Yeo, H Liu, and KA Johnson, *The Journal of Neuroscience*, vol. 32, no. 31, p. 10649-10661, 2012. PMCID: PMC3483645

J41. "Network Assemblies in the Functional Brain." J Sepulcre, MR Sabuncu, and KA Johnson, *Current Opinion in Neurology*, vol. 25, no. 4, p. 384-391, 2012. PMID: 22766721

J42. "A Coding Variant in CR1 Interacts with APOE-ε4 to Influence Cognitive Decline." BT Keenan, JM Shulman, LB Chibnik, T Raj, D Tran, MR Sabuncu, AN Allen, et al., *Human molecular genetics*, vol. 21, no. 10, p. 2377-2388, 2012. PMID: 22343410

J43. "Measuring and Comparing Brain Cortical Surface Area and Other Areal Quantities." AM Winkler, MR Sabuncu, BTT Yeo, B Fischl, DN Greve, P Kochunov, TE Nichols, J Blangero, and DC Glahn, *NeuroImage*, vol. 61, no. 4, p. 1428-1443, 2012. PMID: 22446492

J44. "The Influence of Head Motion on Intrinsic Functional Connectivity MRI." K Van Dijk, MR Sabuncu, and RL Buckner, *NeuroImage*, vol. 59, no. 1, p. 431-438, 2012. PMID: 21810475

J45. "The Association between a Polygenic Alzheimer Score and Cortical Thickness in Clinically Normal Subjects." MR Sabuncu, RL Buckner, JW Smoller, P Hyuon-Lee, B Fischl, and RA Sperling, *Cerebral Cortex*, vol. 22, no. 11, p. 2653-2661, 2012. PMID: 22169231

J46. "The Organization of the Human Cerebral Cortex Estimated by Functional Connectivity." BTT Yeo, FM Krienen, J Sepulcre, MR Sabuncu, D Lashkari, M Hollinshead, JL Roffman, JW Smoller, L Zöllei, JR Polimeni, B Fischl, H Liu, and RL Buckner, *Journal of Neurophysiology*, vol. 106, no. 3, 2011. PMID: 21653723

J47. "The dynamics of cortical and hippocampal atrophy in Alzheimer's disease." MR Sabuncu, RS Desikan, J Sepulcre, BTT Yeo, H Liu, NJ Schmansky, M Reuter, MW Weiner, RL Buckner, RA Sperling, and B. Fischl. *Archives of Neurology*, vol. 68, no. 8, 2011. PMID: 21825241

J48. "Selective disruption of the cerebral neocortex in Alzheimer's disease." RS Desikan, MR Sabuncu, NJ Schmansky, M Reuter, HJ Cabral, CP Hess, MW Weiner, A Biffi, CD Anderson, J Rosand, DH Salat, TL Kemper, AM Dale, RA Sperling and B Fischl*, PLoS ONE*, vol. 5, no. 9, 2010. PMID: 20886094

J49. "Genetic Variation and Neuroimaging Measures in Alzheimer Disease." A Biffi, CD Anderson, RS Desikan, MR Sabuncu, L Cortellini, N Schmansky, D Salat and J Rosand, *Archives of Neurology*, vol. 67, no. 6, p. 677-685, 2010. PMID: 20558387

J50. "A Generative Model for Image Segmentation Based on Label Fusion." MR Sabuncu*, BTT Yeo*, K Van Leemput, B Fischl, and P Golland. *IEEE Transactions on Medical Imaging*, vol. 29, no. 10, p. 1714-1729, 2010. PMID: 20562040

J51. "Learning Task-Optimal Registration Cost Functions for Localizing Cytoarchitecture and Function in the Cerebral Cortex." BTT Yeo, MR Sabuncu, T Vercauteren, D Holt, K Amunts, K Zilles, P Golland, B Fischl. *IEEE Transactions on Medical Imaging*, vol. 29, no. 7, p. 1424-41, 2010. PMID: 20529736

J52. "Spherical Demons: Fast Diffeomorphic Landmark-free Surface Registration." BTT Yeo*, MR Sabuncu*, T Vercauteren, N Ayache, B Fischl and P Golland. *IEEE Transactions on Medical Imaging,* vol. 29, no. 3, p. 650-668, 2010. PMID: 19709963

J53. "Function-based inter-subject alignment of the cortical anatomy." MR Sabuncu*, BD Singer*, B Conroy, RE Bryan, PJ Ramadge and JV Haxby, *Cerebral Cortex*, vol. 20, no. 1, p. 130-140, 2010. PMID: 19420007

J54. "Image-driven Population Analysis through Mixture-Modeling." MR Sabuncu, SK Balci, ME Shenton and P Golland. *IEEE Transactions on Medical Imaging*, vol. 28, no. 9, p. 1473-1487, 2009. PMID: 19336293

J55. "Consistency Clustering: A Robust Algorithm for Group-Wise Registration, Segmentation and Automatic Atlas Construction in Diffusion MRI." U Ziyan, MR Sabuncu. WEL Grimson, and CF Westin, *International Journal of Computer Vision*, vol. 85, no. 3, p. 279-290, 2009. PMID: 20442792

J56. "Effects of Registration Regularization and Atlas Sharpness on Segmentation Accuracy." BTT Yeo*, MR Sabuncu*, R Desikan, B Fischl and P Golland, *Medical Image Analysis Journal*, vol. 12, p. 603-615, 2008. PMID: 18667352. ***Winner of Young Investigator Publication Impact Award at MICCAI'11.***

J57. "Using Spanning Graphs for Efficient Image Registration." MR Sabuncu and PJ Ramadge, *IEEE Transactions on Image Processing*, vol. 17, no. 5, p. 788-797, May 2008. PMID: 18390383

- **Peer-reviewed Conference**

C1. "Generalized Cross Entropy Loss for Training Deep Neural Networks with Noisy Labels." Z Zhang, and MR Sabuncu, *Proc of Neural Information Processing Systems (NIPS)*, 2018.

C2. "Unsupervised Learning for Fast Probabilistic Diffeomorphic Registration." AV Dalca, G Balakrishnan, J Guttag, and MR Sabuncu. *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (*MICCAI*)*, 2018.

C3. "Anatomical Priors in Convolutional Networks for Unsupervised Biomedical Segmentation." A Dalca, J Guttag, and MR Sabuncu. *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*. 2018.

C4. "An Unsupervised Learning Model for Deformable Medical Image Registration." G Balakrishnan, A Zhao, MR Sabuncu, J Guttag, and AV Dalca. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition* (pp. 9252-9260), 2018.

C5. "Population Based Image Imputation." AV Dalca, KL Bouman, WT Freeman, NS Rost, MR Sabuncu, P Golland. International Conference on *Information Processing in Medical Imaging* (IPMI), 2017.

C6. "A Sparse Bayesian Learning Algorithm for Longitudinal Image Data." MR Sabuncu. *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (*MICCAI*)*, 2015.

C7. "Predictive Modeling of Anatomy with Genetic and Clinical Data." AV Dalca, R Sridharan, MR Sabuncu, and Polina Golland. *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (*MICCAI*)*, 2015.

C8. "Mid-Space-Independent Symmetric Data Term for Pairwise Deformable Image Registration". I Aganj, JE Iglesias, M Reuter, MR Sabuncu, and B Fischl. *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (*MICCAI*)*, 2015.

C9. "A Universal and Efficient Method to Compute Maps from Image-based Prediction Models." MR Sabuncu, (2014), *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (*MICCAI*)*, 2014.

C10. "A Cautianary Analysis of STAPLE Using Direct Inference of Segmentation Truth." K Van Leemput and MR Sabuncu, (2014), *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (*MICCAI*)*, 2014.

C11. "Segmentation of Cerebrovascular Pathologies in Stroke Patients with Spatial and Shape Priors." A Dalca, R Sridharan, L Cloonan, K Fitzpatrick, A Kanakis, K Furie, J Rosand, O Wu, MR Sabuncu, N Rost, and P Golland. *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (*MICCAI*)*, 2014.

C12. "Example-based Restoration of High-resolution Magnetic Resonance Image Acquisitions." E Konukoglu, A van der Kouwe, MR Sabuncu, and B Fischl (2013), *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (*MICCAI*),* p. 131-138, 2013.

C13. "A probabilistic, non-parametric framework for inter-modality label fusion." JE Iglesias, MR Sabuncu, and K Van Leemput, (2013), *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (*MICCAI*),* p. 576-583, 2013.

C14. "Incorporating Parameter Uncertainty in Bayesian Segmentation Models: Application to Hippocampal Subfield Volumetry." J Iglesias, MR Sabuncu, and K Van Leemput, *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (*MICCAI*),* LNCS 7512, p. 50-57, 2012.

C15. "A Generative Model for Multi-atlas Segmentation Across Modalities." JE Iglesias, MR Sabuncu, and K Van Leemput, *International Symposium on Biomedical Imaging (ISBI),* 2012.

C16. "The Relevance Voxel Machine (RVoxM): A Bayesian method for Image-based prediction." MR Sabuncu and K Van Leemput, *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (*MICCAI), LNCS 6893, p. 99–106, 2011.

C17. "Supervised Nonparametric Image Parcellation." MR Sabuncu, BTT Yeo, K Van Leemput, B Fischl, and P Golland, *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (*MICCAI*),* LNCS 5762, p. 1075-83, 2009.

C18. "Asymmetric Image-Template Registration." MR Sabuncu, BTT Yeo, T Vercauteren, K Van Leemput and P Golland, *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (*MICCAI*),* LNCS 5761, p. 565-573, 2009.

C19. "Task-optimal Registration Cost Functions." BTT Yeo, MR Sabuncu, B Fisch and P Golland, *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (*MICCAI*),* LNCS 5761, p. 598-606, 2009.

C20. "A Unified Framework for MR Based Disease Classification." KM Pohl and MR Sabuncu, *Information Processing in Medical Imaging (IPMI) 2009,* LNCS 5636, p. 300-313, 2009.

C21. "Discovering Modes of an Image Population through Mixture Modeling." MR Sabuncu, SK Balci, and P Golland. *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI),* LNCS 5242, p. 381-389, 2008.

C22. "Spherical Demons: Fast Surface Registration." BTT Yeo, MR Sabuncu, T Vercauteren, N Ayache, B Fischl, and P Golland. *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (*MICCAI*),* LNCS 5241, p. 745-753, 2008.

C23. "Analysis of Surfaces Using Constrained Regression Models." S Darkner, MR Sabuncu, P Golland, R Paulsen and R Larsen. *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, LNCS 5241, p. 842-849, 2008.

C24. "Fiber Bundle-based Nonlinear Registration of Diffusion MR Images." U Ziyan, MR Sabuncu, L O'Donnell, and CF Westin, *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, LNCS 4791, p. 351-358, 2007.

C25. "Effects of Registration Regularization and Atlas Sharpness on Segmentation Accuracy." BTT Yeo, MR Sabuncu, R Desikan, B Fischl and P Golland, *Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, LNCS 4791, p. 683-691, 2007. ***Winner of MICCAI 2007 Young Scientist Award***.

C26. "Graph Theoretic Image Registration Using Prior Examples." MR Sabuncu and PJ Ramadge. *Proceedings of EUSIPCO 2005*, Antalya, Turkey, September 2005.

C27. "Gradient based Optimization of an EMST Registration Function." MR Sabuncu and PJ Ramadge. *Proceedings of IEEE ICASSP 2005*, Philadelphia, March 2005.

C28. "Fast Alignment of Digital Images Using a Lower Bound on an Entropy Metric." MR Sabuncu, PJ Ramadge. *Proceedings of IEEE ICIP 2004*, Singapore, October 2004.

C29. "Gradient based Non-uniform Sub-sampling for Information-theoretic Alignment Methods." MR Sabuncu and PJ Ramadge. *Proceedings of IEEE International Conference of EMBS 2004*, San Francisco, CA, September 2004.

- **Peer-reviewed Workshop**

W1. "A Bayesian Disease Progression Model for Clinical Trajectories", Y Zhu, and MR Sabuncu. Beyond MIC Workshop, MICCAI 2018.

W2. "3D Convolutional Neural Networks for Classification of Functional Connectomes." M Khosla, K Jamison, A Kuceyeski, and MR Sabuncu. Deep Learning in Medical Image Analysis (DLMIA) Workshop at MICCAI 2018.

W3. "An Improved Optimization Method for the Relevance Voxel Machine." M Ganz, MR Sabuncu, and K Van Leemput. In *Machine Learning in Medical Imaging* (pp. 147-154) at MICCAI 2013.

W4. "On Feature Relevance in Image-Based Prediction Models: An Empirical Study." E Konukoglu, M Ganz, K Van Leemput, and MR Sabuncu. In *Machine Learning in Medical Imaging* (pp. 171-178) at MICCAI 2013.

W5. "A Bayesian Algorithm for Image-Based Time-to-Event Prediction." MR Sabuncu. In *Machine Learning in Medical Imaging* (pp. 74-81) at MICCAI 2013.

W6. "Towards Efficient Label Fusion by Pre-Alignment of Training Data." M Depa, G Holmvang, EJ Schmidt, P Golland, and MR Sabuncu, *Proceedings of Workshop on Multi-atlas Labeling and Statistical Fusion at MICCAI'11,* 2011.

W7. "Building an Average Population HARDI Atlas." S Bouix, Y Rathi, and MR Sabuncu, *Proceedings of the Workshop on Computational Diffusion MRI at MICCAI'10,* 2010.

W8. "Nonparametric Mixture Models for Supervised Image Parcellation." MR Sabuncu, BTT Yeo, K Van Leemput, B Fischl, and P Golland, *Proceedings of the Workshop on Probabilistic Models for Medical Image Analysis at MICCAI'09,* 2009.

W9. "Prediction of Successful Memory Encoding from fMRI Data." SK Balci, MR Sabuncu, J Yoo, SS Ghosh, S Whitefield-Gabrieli, JDE Gabrieli, and P Golland. *Proceedings of the Analysis of Functional Medical Images Workshop at MICCAI'08,* 2008.

W10. "What Data to Co-register for Computing Atlases." BTT Yeo, MR Sabuncu, B Fischl, and P Golland. *Proceedings of the International Conference on Computer Vision (ICCV): IEEE Computer Society Workshop on Mathematical Methods in Biomedical Image Analysis (MMBIA)*, 2007.

W11. "A Robust Algorithm for Fiber-bundle Atlas Construction." U Ziyan, MR Sabuncu, and CF Westin. *Proceedings of the International Conference on Computer Vision (ICCV): IEEE Computer Society Workshop on Mathematical Methods in Biomedical Image Analysis (MMBIA),* 2007.

W12. "Joint Registration and Clustering of Images." MR Sabuncu and P Golland, *Proceedings of the Statistical Registration Workshop at MICCAI'07,* 2007.

W13. "Spatial Information in Entropy based Image Registration." MR Sabuncu and PJ Ramadge, *Workshop on Biomedical Image Registration*, LNCS 2717, Springer-Verlag, 2003.

- **Edited Books**

E1. "Imaging Genetics", Editors: AV Dalca, NK Batmanghelich, MR Sabuncu, L Shen. Elseiver 2017.

E2. "Machine Learning and Medical Imaging," Editors: G Wu, D Shen, and MR Sabuncu, Elsevier 2016.

- **Miscellaneous**

M1. "Increasing Statistical Power by Modeling Spatiotemporal Correlations in Longitudinal Neuroimage Data." J Bernal-Rusiel, D Greve, M Reuter, B Fischl and MR Sabuncu, *19th Annual Human Brain Mapping Conference*, 2013.

M2. "A Generative Model for Probabilistic Label Fusion of Multimodal Data." J Iglesias, MR Sabuncu, and K Van Leemput, *Proceedings of the Workshop on Multimodal Brain Image Analysis at MICCAI'12*, 2012.

M3. "Modeling anatomical heterogeneity in populations." P Golland and MR Sabuncu, *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2011.

M4. "Automatic Surface-based Interhemispheric Registration with FreeSurfer." D.N. Greve, M.R. Sabuncu, R.L. Buckner, B. Fischl. *17th Annual Human Brain Mapping Conference,* 2011.

M5. "Entropy-based Image Registration." MR Sabuncu, *PhD Thesis*, Princeton University, 2006.

M6. "Function-based inter-subject alignment of the cortical anatomy." MR Sabuncu, B.D. Singer, R.E. Bryan, P. J. Ramadge, and J.V. Haxby. *12th Annual Human Brain Mapping Conference*, Florence, Italy, June 2006.

- **Pre-Prints (Under Review)**

PP1. "Deep convolutional neural networks for segmenting 3D in vivo multiphoton images of vasculature in Alzheimer disease mouse models." M Haft-Javaherian, L Fang, V Muse, CB Schaffer, N Nishimuraa, and MR Sabuncu. *arXiv preprint arXiv:1801.00880*. 2018.

PP2. "3D Convolutional Neural Networks for Classification of Functional Connectomes." M Khosla, K Jamison, A Kuceyeski, and MR Sabuncu. *arXiv preprint arXiv:1806.04209*. 2018.

- **Patents**

P1. "Image Registration using Minimum Entropic Graphs." MR Sabuncu and C Chefd'hotel. US Patent 20060093240.

P2. "Incorporating Prior Knowledge from Pre-Aligned Image Pairs into EMST-Based Image Registration." MR Sabuncu and C. Chefd'hotel. US Patent 20070086677.

GRANTS AND OTHER FINANCIAL SUPPORT

- National Science Foundation (NSF)

  "CAREER: New Learning-based Algorithms for the Analysis of Very-Large-Scale Neuroimaging Data" (PI: Sabuncu), 2018-23

  Total funds: **US$ 581,438**

- Dystonia Medical Research Foundation

  "Machine learning guided deep brain stimulation to cure neurological disease" (PI: Goldberg, Co-I: Sabuncu)

  Total funds: **US$ 170,000**

- National Institutes of Health (NIH) R01 Grant from NLM (1R01 LM012719)

  "Novel Bioinformatics Strategies to Study Associations Between Genetic Variants and Neuroanatomical Shape" (PI: Sabuncu)

  Total funds: **US$ 1,618,729**

- National Institutes of Health (NIH) R01 Grant from NIA (1R01 AG053949-01A1)

  "Advanced machine learning algorithms that integrate genomewide, longitudinal MRI and demographic data to predict future cognitive decline toward dementia" (PI: Sabuncu)

  Total funds: **US$ 2,137,500**

- National Science Foundation (NSF)

  "Cornell Neurotechnology Hub for large scale, noninvasive recording of neural activity" (PI: Xu, Co-I: Sabuncu)

  Total funds: **approx. US$ 9,000,000**

- National Institutes of Health (NIH) R21 Grant from NIA (1R21AG050122-01A1), 2016-18

  "Multi-modal Prediction of Future Clinical Dementia" (PI: Sabuncu)

  Total funds: **US$ 478,500**

- National Institutes of Health (NIH) STTR Grant from NIA (1R41AG052246-01), 2015-17

  "A Structural Brain MRI Dementia Forecast Tool" (PI: Schmansky, Co-PI: Sabuncu)

  Total funds: **US$ 225,000**

- MGH Executive Committee On Research, Deliberative Interim Research Support Grant (2015-2017)

  "Novel Methods for Testing Complex Associations in Neuroimaging Genetics" (PI: Sabuncu)

  Total funds: **US$ 86,250**

- National Institutes of Health (NIH) K25 Career Development Grant, 2011-17.

  "Multivariate Pattern Analysis Methods for Neuroimaging Genetics Studies" (PI: Sabuncu)

  Total funds: **US$ 876,960**

- American Health Assistance Foundation (AHAF, now joined with BrightFocus) Alzheimer's Disease Pilot Grant, 2012-15. Role: PI. Total funds: over **US$ 260,000.**
- Harvard Catalyst KL2 MeRIT Award, 2010-12. Role: PI. Total funds: over **US$ 250,000.**
- Siemens Research Grant, 2004-2006. Partial support for PhD studies at Princeton.
- Graduate Fellow, Department of Electrical Engineering, Princeton University, Princeton, NJ. 2001-02.
- Undergraduate Fellowship, Middle East Technical University, Ankara, Turkey. 1997-2001.

HONORS AND AWARDS

- NSF CAREER AWARD, 2018
- NIH RESEARCH CAREER DEVELOPMENT AWARD (K25), 2011
- Winner of Young Investigator Publication Impact Award at MICCAI'11. Co-authored paper.
- Winner of MICCAI 2007 Young Scientist Award. Co-authored paper.
- Outstanding Teaching Assistant Award, Department of Electrical Engineering, Princeton University, Princeton, NJ. 2006.
- Bulent Kerim Altay Award, given by the Electrical and Electronics Engineering Department at Middle East Technical University to the student who, based on semester grades, ranks first in his/her class. Fall 1997 and 1999; Spring 1998, 1999 and 2000.
- Ranked 90th in Turkey's nationwide university entrance exam among approximately 1.5 million candidates, 1997.

SELECT PAST INVITED TALKS

- "Rapid, Efficient, and Robust Neuroimage Analysis with Deep Neural Networks", Department of Electrical Engineering, Institute for Computational Biomedicine, Weill Cornell, May 2018.
- "Rapid, Efficient, and Robust Neuroimage Analysis with Deep Neural Networks", Department of Electrical Engineering, University of Southern California, April 2018.
- "Rapid, Efficient, and Robust Neuroimage Analysis with Deep Neural Networks", Computer Science Department, Rutgers University, March 2018.
- "Novel computational tools to examine the genetic basis of brain structure and function", Seminar at Department of Radiology, Weill Cornell Medicine, March 2017.
- "An Imaging Genetics Study of Alzheimer's Disease", The Functional and Structural Brain Networks Workshop at Bogazici University, Istanbul, Turkey, July 2016.
- "Probing the Genetic Underpinnings of Brain Structure in Healthy Subjects and Alzheimer's Disease Patients," Biomedical Research Imaging Center Seminar Series, UNC Chapel Hill, May 2016.
- "Probing the Genetic Underpinnings of Brain Structure in Healthy Subjects and Alzheimer's Disease Patients," Keynote Speech at UPenn Workshop on Imaging Genetics, February 2016.
- "Probing the genetic underpinnings of brain structure in healthy controls and Alzheimer's disease", UC Davis Neurology Grand Rounds, December 2015.

- "Statistical Methods for Large-Scale Neuroimage Analysis." Invited Seminar at Department of Biomedical Engineering, UC Davis, August 2015.
- "Examining the genetic underpinnings of structural neuroimaging phenotypes." Science Bites, Massachusetts General Hospital, Charlestown Navy Yard Faculty Lunch Seminar Series, March 2015.
- "Examining the genetic underpinnings of structural neuroimaging phenotypes." Invited Seminar at Dept. of Radiology and Imaging Sciences, Indiana University School of Medicine, Indianapolis, IN, March 2015.
- "Examining the genetic underpinnings of structural neuroimaging phenotypes." Invited Seminar at Department of Psychology, Yale University, February 2015.
- "Tutorial: Multivariate Methods on Imaging Genetics", First MICCAI Workshop on Imaging Genetics, Boston, September 2014.
- "Machine Learning in (structural) Neuroimage Analysis: Issues and Promise." Invited Talk at BANG Seminar Series at Martinos Center for Biomedical Imaging, MGH/Harvard Medical School, March 2014.
- "The Relevance Voxel Machine: Bayesian image-based prediction." Invited Seminar at Department of Radiology, UPenn, January 2013.
- "The Relevance Voxel Machine: Bayesian image-based prediction." NIPS 2012 Workshop on Machine Learning and Interpretation in NeuroImaging, December 2012.
- "A Generative Model for Probabilistic Label Fusion of Multimodal Data." MICCAI 2012 Workshop on Multimodal Brain Analysis, October 2012.
- "Structural MRI markers of Alzheimer's Disease." Psychiatric Genetics and Translational Research Seminar, Massachusetts General Hospital, October 2011.
- "A Generative Model for Image Segmentation based on Label Fusion." Faculty of Engineering and Natural Sciences, Sabanci University, September 2009.
- "Image-driven Population Analysis through Mixture Modeling." Computer Science Department, Brown University, October 2008.
- "Multiple Atlases for Multiple Purposes." Center for the Study of Brain, Mind and Behavior, Princeton University, Dec 2007.
- "Inter-subject Image Registration." Central for Neural Science, NYU, April 2007.
- "Renyi entropy-based image registration: a graph-theoretic approach." Computer Science and Artificial Intelligence Labs, MIT, Vision Medical Seminar, October 2005.
- "Graph theoretic image registration." Siemens Corporate Research, February 2005.
- "Spatial information in entropy based image registration: application to the human brain." Center for the Study of Brain, Mind and Behavior, Princeton University, Seminar Series on Data Processing Methods in Neuroscience, October 2004.

SERVICE

- **Cornell ECE Service:** Administered Q-exam for Linear Systems (April 2017, 2018)
- **Cornell ECE Service:** Cornell Tech Faculty Search Committee Member (2018-2019)

- **Advisory Group Member of Cornell NeuroTech** (2018-present)
- **Founding Member of Organizing Committee:** Machine Learning in Medicine at Cornell (2017-present). Seminar series and one inter-campus workshop (September 2018).
- **Organizing Committee Member**, Medical Image Computing and Computer Assisted Intervention (MICCAI) Conference, Quebec City, 2017
- **Organizing Committee Member**, Program Co-chair, Medical Image Computing and Computer Assisted Intervention (MICCAI) Conference, Istanbul 2016.
- **Program Committee (PC) Member**, Medical Image Computing and Computer Assisted Intervention (MICCAI) Conference, 2012, 2013, 2014, 2015
- **Organizing Committee Member**, Workshop on Imaging Genetics at MICCAI 2014, MICCAI 2015.
- **Organizing Committee Member**, Machine Learning Challenge at MICCAI 2014.
- **Organizing Committee Member**, Workshop on Machine Learning and Interpretation in Neuroimaging at Neural Information Processing (NIPS) 2011.
- **Member of Editorial Board** of Medical Image Analysis (Impact Factor: 5.3+).
- **Member of Editorial Board** of NeuroImage Journal (Impact Factor: 6.3+).
- **Ad-hoc Reviewer** for Proceedings of National Academy of Sciences, Nature Biomedical Engineering, Bioinformatics, IEEE Transaction on Medical Imaging, IEEE Transactions on Image Processing, IEEE Transactions on Pattern Analysis and Machine Intelligence, NeuroImage, Medical Image Analysis, Alzheimer's and Dementia Journal, Archives of General Psychiatry, Cerebral Cortex, PLoS ONE, Neruobiology of Aging, Neuroinformatics, Brain Imaging and Behavior, and conferences such as MICCAI, IPMI, ISBI, CVPR, ICPR, among others.
- **Grant Reviewer** for Harvard Catalyst Advanced Imaging Pilot Research Grants and Concept Development Awards Program, 2013.
- **Grant Reviewer** for Alzheimer's Association Research Grant Program, 2016.
- **Grant Reviewer** for Alzheimer's Society Research Programme (UK), 2016.
- **Grant Reviewer (ad-hoc),** on NIH SPARC OT3 review panel, June 2017.
- **Grant Reviewer (ad-hoc),** for NSF CISE Big Data Spokes Panel – December 2017.
- **Grant Reviewer (ad-hoc),** on NIH NINDS Special Emphasis Panel for the review of BRAIN U24 and NINDS R24, June 2018.
- **Member of Organizing Committee** of FreeSurfer Tutorial and Workshop, 2010-2012.

MENTORED STUDENTS AND FELLOWS

AT CORNELL

Post-doctoral Fellows

- Adrian Dalca (2016-)
- Yinying Zhu (2017-)

PhD Students (as primary advisor)

- Evan Yu, Cornell BME (2016-)
- Zhilu Zhang, Cornell ECE (2017-)
- Meenakshi Khosla, Cornell ECE (2017-)
- Artem Bolshakov, Cornell Physics (2017-)
- Matthew Pool, Cornell ECE (2018-)
- Gia H Ngo, Cornell ECE (2018-)
- Chinasa Okolo, Cornell CS (2018-)

Master of Science Students

- Cagla D Bahadir, Cornell BME (2017-)

Master of Engineering Students

- Raymond Xu (ECE'18)

Undergraduate Students

- James Redd (CS'18)

PRIOR TO CORNELL

- Serdar Kemal Balci, CSAIL, MIT
- Ulas Ziyan, CSAIL, MIT
- Michal Depa, CSAIL, MIT
- Jorge Bernal-Rusiel, Martinos Center, MGH/HMS
- Juan Eugenio Iglesias, Martinos Center, MGH/HMS
- Luke Gang, Martinos Center, MGH/HMS
- Tian Ge, Martinos Center, MGH/HMS
- Adrian Dalca, CSAIL, MIT
- Xiuming Zhang, National University Singapore

GUEST SPEAKERS HOSTED AT CORNELL

- Jerry Prince (Professor of Electrical and Computer Engineering, Johns Hopkins University)
  October 22, 2018 – Cornell ECE Colloquium
- Jeffrey Fessler (Professor of EECS at University of Michigan)
  October 15, 2018 – Cornell ECE Colloquium
- Michael Miller (Prof and Director of BME at Johns Hopkins)
  October 12, 2018 – Cornell BME Colloquium
- Dorin Comaniciu (Vice President, Medical Imaging Technologies, Siemens Heathineers)
  Sep 27, 2018 - Bridging the Divide: Machine Learning in Medicine Workshop in Ithaca, NY
- Richard Leahy (Professor of Electrical Engineering at University of Southern California)

Nov 17, 2017 - Machine Learning in Medicine Seminar

- Finale Doshi-Valez (Assist. Prof of CS at Harvard)
  August 28, 2017 - Machine Learning in Medicine Seminar
- Rene Vidal (Professor of BME at Johns Hopkins)
  May 8, 2017 – Machine Learning in Medicine Seminar