

# Brian Avants

## Curriculum Vitae

3600 Market St, Suite 370  
Philadelphia, PA 19104

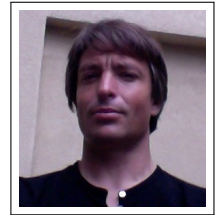
☎ (215) 870 0787

FAX (215) 615 3681

✉ [avants@grasp.cis.upenn.edu](mailto:avants@grasp.cis.upenn.edu)

🏠 [homepage](#)

My H-index: [33 \(link\)](#), Pubmed: [\(papers\)](#)



### Education

- 2005 **Ph.D.**, *The University of Pennsylvania*, Philadelphia, PA, *Bioengineering*.
- 2002 **M.S.**, *The University of Pennsylvania*, Philadelphia, PA, *Computer Science*.
- 1998 **B.A.**, *New College of Florida*, Sarasota, FL, *Physics*.

### Postgraduate Training and Fellowships

- 2006 Research Fellow, Radiology, University of Pennsylvania

### Professional Appointments

- 2012 Assistant Professor of Radiology, University of Pennsylvania
- 2010 Research Associate, Radiology, University of Pennsylvania

### Specialty Certification

- 2008–2013 Human Subjects Research Training University of Pennsylvania

### Awards and Honors

- 2013 Advanced Normalization Tools with R ([ANTsR](#)) wins BRATS 2013 Tumor Segmentation Challenge at MICCAI, Nagoya, Japan (with Nick Tustison).
- 2013 Advanced Normalization Tools ([ANTs](#)) finishes first in two of three segmentation categories at SATA challenge, MICCAI, Nagoya, Japan (with Nick Tustison).
- 2012 Advanced Normalization Tools ([ANTs](#)) Software Selected to provide "Standard Setting" image registration results for MICCAI 2013 Multi-Atlas Segmentation Challenge: 4D cardiac, brain and multimodality canine leg MR images
- 2012 All [top finishers](#) in 2012 MICCAI multi-atlas segmentation used ANTs
- 2010 ANTs finished *1st overall* in an unbiased [EMPIRE10](#) international lung mapping competition
- 2009 ANTs finished in *1st rank* in an unbiased [Klein 2009](#) international brain mapping competition
- 2007 Young Investigator Award, General Medical Computing, MICCAI
- 2003 Best Poster Award SPIE Medical Imaging

- 1995 Future Healthcare Researcher Scholarship, Humana Health Care  
1994 National Merit Scholarship, New College of Florida, Sarasota, FL

## Editorial Positions

- Topic Editor - Frontiers in Neuroinformatics: [ITK topic](#)  
Ad hoc Reviewer - Nature Neuroscience  
Ad hoc Reviewer - Neuroimage  
Ad hoc Reviewer - IEEE Transaction on Medical Imaging  
Ad hoc Reviewer - Pediatrics  
Ad hoc Reviewer - Medical Physics  
Ad hoc Reviewer - Human Brain Mapping  
Ad hoc Reviewer - IEEE Pattern Analysis Machine Intelligence  
Ad hoc Reviewer - Medical Image Analysis

## Academic and Institutional Committees

- 2013 Grant Reviewer - Alzheimer's Association  
2013 Consultant, American College of Radiology Head Injury Institute Information Technology Committee  
2013 Doctoral committee member for Efstathios D Gennatas  
2010–  
present [Insight ToolKit](#) Version 4 Development Leader and regular contributor to this large-scale industry-academic collaborative effort sponsored by NLM  
2011–  
present International Neuroinformatics Coordinating Facility Registration and Atlasing Task Force Member ([youtube video](#))  
2006–  
present Spatial Transformations Informatics Technology Initiative (SIFTI) member  
2006–  
present Neuroimaging Informatics Tools and Resources Clearinghouse member

## Major Academic and Clinical Teaching Responsibilities

- 2012–  
present Organizer of Provost-sponsored Penn Interdisciplinary Seminar Series on multi-modality brain mapping: See [brainomics link](#) for full list of activities  
2013 Hosted Moriah Thomason for talk on Fetal Connectome  
2013 Hosted Mert Sabuncu for talk on Relevance Vector Machines  
2012 Hosted David Van Essen for talk on Human Connectome Project  
2010–  
present Advising Ben Kandel, Doctoral student, Bioengineering; Ben's work was awarded an oral presentation at IPMI-2013  
2010–  
present Co-advising Paramveer Dhillon, Doctoral student, Computer Science with Professor Lyle Ungar; Paramveer's recent work was awarded an oral presentation at PRNI-2013

## Lectures by Invitation

- 2014 "Eigenwords & Eigenanatomy for Decoding Neural Representations of Semantics," HRL, Malibu, CA, April 2014
- 2014 "ANTs & Eigenanatomy for Integrative Brain Mapping ", University of Calgary, Calgary, Alberta Feb 2014
- 2013 "Multivariate Medical Imaging Analysis with R", MICCAI 2013, Nagoya, Japan Sep 2013
- 2013 "ANTs & Eigenanatomy", Neuroimaging Training Program, UCLA, Los Angeles, CA July 2013
- 2013 "Multi-Modality Analysis", CMROI Workshop, University of Pennsylvania, Philadelphia, PA Mar 2013
- 2012 "Early Home Environment Impacts Cortical Thickness in Young Adulthood", Chinese Academy of Sciences, Beijing, China May 2012
- 2012 "A Unified Image Registration Framework for ITKv4", National Library of Medicine, Bethesda, MD Oct 2012
- 2012 "A Unified Registration Framework for ITKv4," WBIR 2012, Nashville, TN Jul 2012
- 2012 "Early Home Environment Impacts Cortical Thickness in Young Adulthood," Society for Neuroscience Press Conference, New Orleans, LA Oct 2012
- 2012 "Multivariate Methods for Integrating Multiple Modalities in Brain Mapping", Incheon National University, Incheon, South Korea May 2012
- 2012 "Eigenanatomy Methods for Multivariate Brain Mapping", University of California, San Francisco Jun 2012
- 2011 "Open Source Neonatal Brain Mapping," Washington University at St. Louis, St. Louis, MO Jan 2011
- 2011 "Multivariate analyses improve detection power for cortical longitudinal change in dementia", Society for Neuroscience Meeting, Washington D.C. Nov 2011
- 2011 "Modern analytics for neuroimaging," University of California, Los Angeles Dec 2011
- 2011 "Multivariate methods in neuroimaging", Washington Univ. at St. Louis Feb 2011
- 2011 "ITKv4 Image Registration Tutorial", MICCAI 2011, Toronto, Canada Sep 2011
- 2010 "Open Source in Medical Imaging" Inst. of Automation, Chinese Academy of Sciences, Beijing, China. Sep 2010
- 2010 "Open Source Image Registration", National Library of Medicine, Bethesda, MD Jun 2010
- 2010 "Multivariate Longitudinal Correlation of Atrophy in White Matter and Gray Matter" MICCAI, Beijing, China. Sep 2010
- 2010 "Advanced ITK-Based Image Registration," NLM, Bethesda, MD. Jul 2010

- 2010 "Sparse Unbiased Analysis of Anatomical Variance in Longitudinal Neuroimaging," MICCAI 2010, Beijing China. (45 of 786 submissions accepted for oral presentation). Sep 2010
- 2009 "Grammatical comprehension and longitudinal adolescent brain development: a multivariate DTI and T1 analysis," Human Brain Mapping 2009, San Francisco, CA. Jun 2009
- 2009 "Democratizing Hippocampus Labeling," Columbia University, NY, NY. Jul 2009
- 2009 "Multivariate Analysis of the Adolescent Brain and its Association with Language Development," Columbia University, NY, NY. Jul 2009
- 2009 "Follow-Up on Effects of Prenatal Cocaine Exposure on the Young Adult Brain," Eastern SPR, Philadelphia, PA. Mar 2009
- 2009 "Multivariate Methods and Applications for Neuroimaging," SRI, Menlo Park, CA. Jul 2009
- 2008 "The Longitudinal Effect of Neurodegeneration of Language Network Neuroanatomy and Cognition," Pendergrass Symposium, Univ. of Penn. Philadelphia, PA Jun 2008
- 2008 "Template-based Brain Mapping with Diffeomorphisms," Janelia Farm, Ashburn, Virginia. Sep 2008
- 2008 "Multivariate Template-based Retinotopic Mapping," Stanford Vision Science Group, Stanford University, Palo Alto, CA. Oct 2008
- 2007 "Symmetric Shape Averaging in the Diffeomorphic Space", International Symposium Biomedical Imaging, Washington DC. Apr 2007
- 2007 "Spatiotemporal Normalization for Longitudinal Analysis of Gray Matter Atrophy in Frontotemporal Dementia," MICCAI 2007, Brisbane, Australia. Oct 2007
- 2007 Tutorial on Neuromorphometry, MICCAI 2006, Copenhagen, Denmark. Oct 2006
- 2007 "Geodesic shape averaging," IEEE International Symposium on Biomedical Imaging 2006, Alexandria, VA Apr 2006
- 2007 "Mapping Statistical Patterns in Medical Images via Diffeomorphisms," Univ. of Pennsylvania, CIS 520 lecture, Philadelphia, PA. Nov 2005
- 2005 "Shape Optimizing Diffeomorphisms in Medical Imaging," ISI, Utrecht, NL Jul 2005

## Grants

### Pending

The Imaging Genomics of Pediatric Executive Function, NIH, K01, 1/2015-12/2020 (Avants, Brian, PI), \$275,000/annual direct costs, 80% effort (Big data training grant.)

## Current

Neuroscience Neuroimaging Center, NIH, P30-NS045839-07, 9/2013-8/2018 (Detre, John, M.D., PI), \$499,727/annual direct costs, 10% effort (Role in grant: Collaborator, To provide support for technical aspects of neuroimaging using MRI.)

IARPA-sponsored Knowledge Representation in Neural Systems (KRNS), IARPA-BAA-12-05, 50% effort (Role in grant: Image Analysis Lead)

Age, Hearing Loss, And Sentence Comprehension: Neural Correlates, National Institute On Aging/Nih/Dhhs, 5-R01-AG-038490-05, 9/2012-7/2013 (Murray Grossman, PI), \$291,978/annual direct costs (Role in grant: Co-PI)

Continued Development and Maintenance of ITK-SNAP 3D Image Segmentation Software, NIH, R01-EB014346-01, 9/2011-8/2015 (Yushkevich, Paul A., Ph.D., PI), \$350,824/annual direct costs (Role in grant: Collaborator)

TDP-43 Proteinopathies in ALS-Dementia, NIH, P01-AG032953-02, 9/2010-8/2015 (Lee, Virginia/Grossman, Murray, PI), \$729,272/annual direct costs (Role in grant: Collaborator)

Fundamental Refactoring Of Deformable Image Registration In Itk With Distributed Computing And Gpu Acceleration, National Library Of Medicine, HHSN276201000492P, 6/2010-6/2013 (JAMES C GEE, PI), \$472,861/annual direct costs (Role in grant: Co-PI)

In Utero Cocaine Exposure: Adolescent & Young Adult Neurocognitive Outcome, Children's Hospital of Philadelphia, R01-DA14129-08, 8/2007-4/2013 (Gee, James C., Ph.D., PI), \$102,515/annual direct costs (Role in grant: Collaborator, To explore the effects of gestational cocaine exposure on neurocognitive outcome of adolescents and young adults)

## Past

Longitudinal Multi-model Neuroimaging of Natural Recovery after Traumatic Brain Injury: A Pilot Study, Moss Rehab Research Institute/NIH, 2/2011-1/2012 (Avants, Brian Ph.D., PI), \$7,764/annual direct costs (Role in grant: PI)

Parkinsons Disease & Dementia, NIH, P50-NS053488-04S1, 6/2010-5/2012 (Trojanowski/Grossman, PI), \$132,641/annual direct costs (Role in grant: Collaborator)

Pediatric Template Of Brain Perfusion, National Institute Of Mental Health/Nih/Dhhs, 3-R01-MH-080892-01A2S1, 9/2009-5/2010 (JiongJiong Wang, PI) \$0/annual direct costs, (Role in grant: Co-PI)

Tract-Specific Analysis of Brain White Matter, NIH, R01-NS065347-02, 9/2009-8/2012 (Gee, James C., Ph.D., PI), \$370,667/annual direct costs, (Role in grant: Collaborator)

Advanced Neuroimages Registration Methods: Effects of Prenatal Cocaine Exposure, NIH, 9/2008-9/2011 (James C. Gee, PI: Brian Avants, Co-Investigator), \$354,375/annual direct costs, (Role in grant: Co-PI)

The Longitudinal Effect of Neurodegeneration on Language-Network Neuroanatomy and Cognition, University of Pennsylvania, Institute of Aging, 6/2008-1/2011 (James C. Gee, PI: Brian Avants, Co-Investigator), (Role in grant: Co-PI)

Long Term Effects of Prenatal Cocaine Exposure, NIH , 4/2007-1/2011 (Hallam Hurt, PI), (Role in grant: Research Scientist)

Shape Optimizing Diffeomorphisms for Computational Biology, NIH - UCLA Center for Computational Biology, R01-EB006266, 4/2006-3/2010 (James C. Gee, PI) (Role in grant: Research Scientist)

Surface-based Cortical Analysis in ITK: Segmentation, Conformal Flattening and Statistics, NLM-NIH ITK Development Grant, 8/2004-6/2009 (James C. Gee, PI, Role in grant: Co-PI, Open source development)

Bioengineering Training in Cardiovascular Pathophysiology, Institute for Medicine and Engineering Training Grant, University of Pennsylvania, Philadelphia, PA, 9/2002-6/2010 (Peter Davies, PI), (Role in grant: Trainee )

## Media Coverage

2013 CNN [article](#) on collaboration with Martha Farah.

2012 Daily Mail UK [article](#) on SFN 2012 presentation

2012 Washington post [article](#) on SFN 2012 presentation

2012 PENN medicine press publicity for our MICCAI 2012 segmentation competition win: [article](#)

## Professional Skills

2000– present Software Engineering & Programming - C++, CMake, R, Bash, Rst, LaTeX, Git, Gerrit, others as needed

Visualization: e.g. [a source of ANTs development](#)

Presentations: e.g. [a Prezi about ANTs \(WIP\)](#)

Reproducible science as a teaching tool: e.g. [ANTs tutorial](#)

Other examples: [slideshow](#)

## Professional Memberships

2011– present The Organization for Human Brain Mapping (OHBM)

2011– present The International Society for Magnetic Resonance in Medicine (ISMRM)

## Languages

English **Mothertongue**

Spanish **Intermediate**

*Conversational*

## Articles Under Review

1. Longitudinal eigenanatomy reveals joint white matter and cortical network decline in behavioral variant frontotemporal degeneration
2. Novelty across imaging modalities: Application to partial volume correction
3. A multimodality pediatric template of brain perfusion
4. Relation of childhood home environment to cortical thickness in late adolescence: Specificity of experience and timing
5. Morphometry with Eigenanatomy
6. A reproducible analysis pipeline for population studies of ASL-based cerebral blood flow

## Journal Publications

1. Tustison, N. J.; Cook, P. A.; Klein, A.; Song, G.; Das, S. R.; Duda, J. T.; Kandel, B. M.; van Strien, N.; Stone, J. R.; Gee, J. C. & **Avants**, B. B. "Large-Scale Evaluation of ANTs and FreeSurfer Cortical Thickness Measurements," *NEUROIMAGE*, (2014).
2. Dhillon, P., Kandel, B., Ungar, L., Wolk, D. A., Gee, J. C. and **Avants**, B. "Subject Specific Functional Parcellation via Prior Based Eigenanatomy," *NEUROIMAGE*, (2014).
3. Adler, D. H., Pluta, J., Kadivar, S., Craige, C., Gee, J. C., **Avants**, B. B. and Yushkevich, P. A. "Histology-derived volumetric annotation of the human hippocampal subfields in postmortem MRI." *NEUROIMAGE*, Vol. 84, pp. 505-523, (2014).
4. N. J. Tustison, B. B. **Avants**, P. A. Cook, J. Kim, J. Whyte, J. C. Gee & J. R. Stone, "Logical circularity in voxel-based analysis: Normalization strategy may induce statistical bias," *HUM BRAIN MAPP*, (2014).
5. McMillan, C. T., **Avants**, B. B., Cook, P., Ungar, L., Trojanowski, J. Q. and Grossman, M. "The power of neuroimaging biomarkers for screening frontotemporal dementia." *HUM BRAIN MAPP*, (2014).
6. McMillan, C. T., Toledo, J. B., **Avants**, B. B., Cook, P. A., Wood, E. M., Suh, E., Irwin, D. J., Powers, J., Olm, C., Elman, L., McCluskey, L., Schellenberg, G. D., Lee, V. M.-Y., Trojanowski, J. Q., Van Deerlin, V. M. and Grossman, M. "Genetic and neuroanatomic associations in sporadic frontotemporal lobar degeneration." *NEUROBIOL AGING*, Vol. 35(6), pp. 1473-1482, (2014).
7. Avants, B. B., Libon, D. J., Rascovsky, K., Boller, A., McMillan, C. T., Massimo, L., Coslett, H. B., Chatterjee, A., Gross, R. G. and Grossman, M. "Sparse canonical correlation analysis relates network-level atrophy to multivariate cognitive measures in a neurodegenerative population." *NEUROIMAGE*, Vol. 84C, pp. 698-711, (2013).
8. W. D. Hopkins & B. B. **Avants**, "Regional and Hemispheric Variation in Cortical Thickness in Chimpanzees (*Pan troglodytes*)", *JOURNAL OF NEUROSCIENCE*, 33, 5241-5248 (2013)
9. J. Kim, B. **Avants**, J. Whyte & J. C. Gee, "Methodological considerations in longitudinal morphometry of traumatic brain injury", *FRONTIERS IN HUMAN NEUROSCIENCE*, 7 (2013)
10. C. T. McMillan, B. **Avants**, D. J. Irwin, J. B. Toledo, D. A. Wolk, V. M. Van Deerlin, L. M. Shaw, J. Q. Trojanowski & M. Grossman, "Can MRI screen for CSF biomarkers in neurodegenerative disease?", *NEUROLOGY*, 80, 132-138 (2013)
11. C. T. McMillan, D. J. Irwin, B. B. **Avants**, J. Powers, P. A. Cook, J. B. Toledo, E. McCarty Wood, V. M. Van Deerlin, V. M.-Y. Lee, J. Q. Trojanowski & M. Grossman, "White matter imaging helps dissociate tau from TDP-43 in frontotemporal lobar degeneration.", *J NEUROL NEUROSURG PSYCHIATRY*, (2013)



12. M. J. Weber, J. A. Detre, S. L. Thompson-Schill & B. B. **Avants** "Reproducibility of functional network metrics and network structure: A comparison of task-related BOLD, resting ASL with BOLD contrast, and resting cerebral blood flow", *COGNITIVE, AFFECTIVE, & BEHAVIORAL NEUROSCIENCE*, accepted (2013)
13. A. Badea, S. Gewalt, B. B. **Avants**, J. J. Cook & G. A. Johnson, "Quantitative mouse brain phenotyping based on single and multispectral MR protocols", *NEUROIMAGE*, 63, 1633-1645 (2012)
14. S. R. Das, B. B. **Avants**, J. Pluta, H. Wang, J. W. Suh, M. W. Weiner, S. G. Mueller & P. A. Yushkevich, "Measuring longitudinal change in the hippocampal formation from in vivo high-resolution T2-weighted MRI", *NEUROIMAGE*, 60, 1266-1279 (2012)
15. R. Datta, J. Lee, J. Duda, B. B. **Avants**, C. H. Vite, B. Tseng, J. C. Gee, G. D. Aguirre & G. K. Aguirre, "A Digital Atlas of the Dog Brain", *PLOS ONE*, 7 (2012)
16. S. S. Ghosh, A. Klein, B. **Avants** & K. J. Millman, "Learning from open source software projects to improve scientific review", *FRONTIERS IN COMPUTATIONAL NEUROSCIENCE*, 6 (2012)
17. R. G. Gross, C. T. McMillan, K. Chandrasekaran, M. Dreyfuss, S. Ash, B. **Avants**, P. Cook, P. Moore, D. J. Libon, A. Siderowf & M. Grossman, "Sentence processing in Lewy body spectrum disorder: The role of working memory", *BRAIN AND COGNITION*, 78, 85-93 (2012)
18. J. L. Hanson, M. K. Chung, B. B. **Avants**, K. D. Rudolph, E. A. Shirtcliff, J. C. Gee, R. J. Davidson & S. D. Pollak, "Structural Variations in Prefrontal Cortex Mediate the Relationship between Early Childhood Stress and Spatial Working Memory", *JOURNAL OF NEUROSCIENCE*, 32, 7917-7925 (2012)
19. J. L. Hanson, J. W. Suh, B. M. Nacewicz, M. J. Sutterer, A. A. Cayo, D. E. Stodola, C. A. Burghy, H. Wang, B. B. **Avants**, P. A. Yushkevich, M. J. Essex, S. D. Pollak & R. J. Davidson, "Robust Automated Amygdala Segmentation via Multi-Atlas Diffeomorphic Registration.", *FRONT NEUROSCI*, 6, 166 (2012)
20. D. R. Hurst, P. T. Schoenemann, M. M. Loyet, B. B. **Avants** & J. C. Gee, "How well does endocranial morphology predict behavioral differences in primates?", *AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY*, 147, 171 (2012)
21. V. Jain, J. Duda, B. **Avants**, M. Giannetta, S. X. Xie, T. Roberts, J. A. Detre, H. Hurt, F. W. Wehrli & D. J. J. Wang, "Longitudinal Reproducibility and Accuracy of Pseudo-Continuous Arterial Spin-labeled Perfusion MR Imaging in Typically Developing Children", *RADIOLOGY*, 263, 527-536 (2012)
22. D. J. Libon, C. McMillan, B. **Avants**, A. Boller, B. Morgan, L. Burkholder, K. Chandrasekaran, L. Elman, L. McCluskey & M. Grossman, "Deficits in Concept Formation in Amyotrophic Lateral Sclerosis", *NEUROPSYCHOLOGY*, 26, 422-429 (2012)
23. M. M. Loyet, P. T. Schoenemann, B. B. **Avants** & J. C. Gee, "Associations between localized variation in brain anatomy and social behavior in healthy human subjects.", *AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY*, 147, 196 (2012)
24. T. Rohlfing & B. **Avants**, "'Nonparametric Local Smoothing' is not image registration.", *BMC RES NOTES*, 5, 610 (2012)
25. M. Ashtari, B. **Avants**, L. Cyckowski, K. L. Cervellione, D. Roofeh, P. Cook, J. Gee, S. Sevy & S. Kumra, "Medial temporal structures and memory functions in adolescents with heavy cannabis use", *JOURNAL OF PSYCHIATRIC RESEARCH*, 45, 1055-1066 (2011)
26. B. B. **Avants**, N. J. Tustison, J. Wu, P. A. Cook & J. C. Gee, "An Open Source Multivariate



- Framework for n-Tissue Segmentation with Evaluation on Public Data", *NEUROINFORMATICS*, 9, 381-400 (2011)
27. B. B. **Avants**, N. J. Tustison, G. Song, P. A. Cook, A. Klein & J. C. Gee, "A reproducible evaluation of ANTs similarity metric performance in brain image registration", *NEUROIMAGE*, 54, 2033-2044 (2011)
  28. A. Boller, D. Libon, K. Rascovsky, R. G. Gross, M. Dreyfuss, B. **Avants**, L. Massimo, P. Moore, J. Kitain, H. Coslett, A. Chatterjee & M. Grossman, "Philadelphia Brief Assessment of Cognition (PBAC): A Validated Screening Measure for Dementia", *NEUROLOGY*, 76, A511 (2011)
  29. S. R. Das, D. Mechanic-Hamilton, J. Pluta, M. Korczykowski, J. A. Detre & P. A. Yushkevich, "Heterogeneity of functional activation during memory encoding across hippocampal subfields in temporal lobe epilepsy.", *NEUROIMAGE*, 58, 1121-1130 (2011)
  30. B. Morgan, R. G. Gross, R. Clark, M. Dreyfuss, A. Boller, E. Camp, T.-W. Liang, B. **Avants**, C. T. McMillan & M. Grossman, "Some is not enough: Quantifier comprehension in corticobasal syndrome and behavioral variant frontotemporal dementia", *NEUROPSYCHOLOGIA*, 49, 3532-3541 (2011)
  31. K. Murphy, B. van Ginneken, J. M. Reinhardt, S. Kabus, K. Ding, X. Deng, K. Cao, K. Du, G. E. Christensen, V. Garcia, T. Vercauteren, N. Ayache, O. Commowick, G. Malandain, B. Glocker, N. Paragios, N. Navab, V. Gorbunova, J. Sporring, M. de Bruijne, X. Han, M. P. Heinrich, J. A. Schnabel, M. Jenkinson, C. Lorenz, M. Modat, J. R. McClelland, S. Ourselin, S. E. A. Muenzing, M. A. Viergever, D. De Nigris, D. L. Collins, T. Arbel, M. Peroni, R. Li, G. C. Sharp, A. Schmidt-Richberg, J. Ehrhardt, R. Werner, D. Smeets, D. Loeckx, G. Song, N. Tustison, B. **Avants**, J. C. Gee, M. Staring, S. Klein, B. C. Stoel, M. Urschler, M. Werlberger, J. Vandemeulebroucke, S. Rit, D. Sarrut & J. P. W. Pluim, "Evaluation of Registration Methods on Thoracic CT: The EMPIRE10 Challenge", *IEEE TRANSACTIONS ON MEDICAL IMAGING*, 30, 1901-1920 (2011)
  32. P. T. Schoenemann, R. Holloway, J. Monge, B. **Avants** & J. Gee, "Differences in endocranial shape between Homo and Pongids assessed through non-rigid deformation analysis of high-resolution CT images.", *AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY*, 144, 265-266 (2011)
  33. N. J. Tustison, B. B. **Avants**, L. Flors, T. A. Altes, E. E. de Lange, J. P. Mugler, III & J. C. Gee, "Ventilation-Based Segmentation of the Lungs Using Hyperpolarized He-3 MRI", *JOURNAL OF MAGNETIC RESONANCE IMAGING*, 34, 831-841 (2011)
  34. N. Tustison, B. **Avants**, P. Cook, J. Kim, J. Whyte, J. Gee, S. Ahlers & J. Stone, "MULTIVARIATE ANALYSIS OF DIFFUSION TENSOR IMAGING AND CORTICAL THICKNESS MAPS IN A TRAUMATIC BRAIN INJURY (TBI) COHORT USING ADVANCED NORMALIZATION TOOLS (ANTS)", *JOURNAL OF NEUROTRAUMA*, 28, A111 (2011)
  35. N. J. Tustison, B. B. **Avants**, M. Siqueira & J. C. Gee, "Topological Well-Composedness and Glamorous Glue: A Digital Gluing Algorithm for Topologically Constrained Front Propagation", *IEEE TRANSACTIONS ON IMAGE PROCESSING*, 20, 1756-1761 (2011)
  36. H. Wang, S. R. Das, J. W. Suh, M. Altinay, J. Pluta, C. Craige, B. **Avants**, P. A. Yushkevich & A. D. N. Initia, "A learning-based wrapper method to correct systematic errors in automatic image segmentation: Consistently improved performance in hippocampus, cortex and brain segmentation", *NEUROIMAGE*, 55, 968-985 (2011)
  37. S. Ash, C. McMillan, D. Gunawardena, B. **Avants**, B. Morgan, A. Khan, P. Moore, J. Gee & M. Grossman, "Speech errors in progressive non-fluent aphasia", *BRAIN AND LANGUAGE*,

- 113, 13-20 (2010)
38. B. B. **Avants**, P. A. Cook, L. Ungar, J. C. Gee & M. Grossman, "Dementia induces correlated reductions in white matter integrity and cortical thickness: A multivariate neuroimaging study with sparse canonical correlation analysis", *NEUROIMAGE*, 50, 1004-1016 (2010)
  39. B. B. **Avants**, P. Yushkevich, J. Pluta, D. Minkoff, M. Korczykowski, J. Detre & J. C. Gee, "The optimal template effect in hippocampus studies of diseased populations", *NEUROIMAGE*, 49, 2457-2466 (2010)
  40. C. Farag, V. Troiani, M. Bonner, C. Powers, B. **Avants**, J. Gee & M. Grossman, "Hierarchical Organization of Scripts: Converging Evidence from fMRI and Frontotemporal Degeneration", *CEREBRAL CORTEX*, 20, 2453-2463 (2010)
  41. M. Grossman, P. J. Eslinger, V. Troiani, C. Anderson, B. **Avants**, J. C. Gee, C. McMillan, L. Massimo, A. Khan & S. Antani, "The role of ventral medial prefrontal cortex in social decisions Converging evidence from fMRI and frontotemporal lobar degeneration", *NEUROPSYCHOLOGIA*, 48, 3505-3512 (2010)
  42. D. Gunawardena, S. Ash, C. McMillan, B. **Avants**, J. Gee & M. Grossman, "Why are patients with progressive nonfluent aphasia nonfluent?", *NEUROLOGY*, 75, 588-594 (2010)
  43. J. L. Hanson, M. K. Chung, B. B. **Avants**, E. A. Shirtcliff, J. C. Gee, R. J. Davidson & S. D. Pollak, "Early Stress Is Associated with Alterations in the Orbitofrontal Cortex: A Tensor-Based Morphometry Investigation of Brain Structure and Behavioral Risk", *JOURNAL OF NEUROSCIENCE*, 30, 7466-7472 (2010)
  44. J. Kim, J. Whyte, S. Patel, B. **Avants**, E. Europa, J. Wang, J. Slattery, J. C. Gee, H. B. Coslett & J. A. Detre, "Resting Cerebral Blood Flow Alterations in Chronic Traumatic Brain Injury: An Arterial Spin Labeling Perfusion fMRI Study", *JOURNAL OF NEUROTRAUMA*, 27, 1399-1411 (2010)
  45. A. Klein, S. S. Ghosh, B. **Avants**, B. T. T. Yeo, B. Fischl, B. Ardekani, J. C. Gee, J. J. Mann & R. V. Parsey, "Evaluation of volume-based and surface-based brain image registration methods", *NEUROIMAGE*, 51, 214-220 (2010)
  46. H. Rao, L. Betancourt, J. M. Giannetta, N. L. Brodsky, M. Korczykowski, B. B. **Avants**, J. C. Gee, J. Wang, H. Hurt, J. A. Detre & M. J. Farah, "Early parental care is important for hippocampal maturation: Evidence from brain morphology in humans", *NEUROIMAGE*, 49, 1144-1150 (2010)
  47. P. T. Schoenemann, J. Monge, R. L. Holloway, B. B. **Avants** & J. C. Gee, "Creating statistical atlases of modern primate endocranial morphology rising non-rigid deformation analysis of high-resolution CT images.", *AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY*, 208-209 (2010)
  48. N. J. Tustison, B. B. **Avants**, P. A. Cook, Y. Zheng, A. Egan, P. A. Yushkevich & J. C. Gee, "N4ITK: Improved N3 Bias Correction", *IEEE TRANSACTIONS ON MEDICAL IMAGING*, 29, 1310-1320 (2010)
  49. D. J. J. Wang, X. Bi, B. B. **Avants**, T. Meng, S. Zuehlsdorff & J. A. Detre, "Estimation of Perfusion and Arterial Transit Time in Myocardium Using Free-Breathing Myocardial Arterial Spin Labeling With Navigator-Echo", *MAGNETIC RESONANCE IN MEDICINE*, 64, 1289-1295 (2010)
  50. P. A. Yushkevich, H. Wang, J. Pluta, S. R. Das, C. Craige, B. B. **Avants**, M. W. Weiner & S. Mueller, "Nearly automatic segmentation of hippocampal subfields in in vivo focal T2-weighted MRI", *NEUROIMAGE*, 53, 1208-1224 (2010)
  51. P. A. Yushkevich, B. B. **Avants**, S. R. Das, J. Pluta, M. Altinay, C. Craige & A. D. N. Initi, "Bias

- in estimation of hippocampal atrophy using deformation-based morphometry arises from asymmetric global normalization: An illustration in ADNI 3 T MRI data", *NEUROIMAGE*, 50, 434-445 (2010)
52. S. Ash, P. Moore, L. Vesely, D. Gunawardena, C. McMillan, C. Anderson, B. **Avants** & M. Grossman, "Non-fluent speech in frontotemporal lobar degeneration", *JOURNAL OF NEUROLINGUISTICS*, 22, 370-383 (2009)
  53. B. **Avants**, A. Khan, L. McCluskey, L. Elman & M. Grossman, "Longitudinal Cortical Atrophy in Amyotrophic Lateral Sclerosis With Frontotemporal Dementia", *ARCHIVES OF NEUROLOGY*, 66, 138-139 (2009)
  54. M. F. Bonner, L. Vesely, C. Price, C. Anderson, L. Richmond, C. Farag, B. **Avants** & M. Grossman, "Reversal of the concreteness effect in semantic dementia", *COGNITIVE NEUROPSYCHOLOGY*, 26, 568-579 (2009)
  55. S. R. Das, B. B. **Avants**, M. Grossman & J. C. Gee, "Registration based cortical thickness measurement", *NEUROIMAGE*, 45, 867-879 (2009)
  56. S. R. Das, D. Mechanic-Hamilton, M. Korczykowski, J. Pluta, S. Glynn, B. B. **Avants**, J. A. Detre & P. A. Yushkevich, "Structure Specific Analysis of the Hippocampus in Temporal Lobe Epilepsy", *HIPPOCAMPUS*, 19, 517-525 (2009)
  57. A. Klein, J. Andersson, B. A. Ardekani, J. Ashburner, B. **Avants**, M.-C. Chiang, G. E. Christensen, D. L. Collins, J. Gee, P. Hellier, J. H. Song, M. Jenkinson, C. Lepage, D. Rueckert, P. Thompson, T. Vercauteren, R. P. Woods, J. J. Mann & R. V. Parsey, "Evaluation of 14 nonlinear deformation algorithms applied to human brain MRI registration", *NEUROIMAGE*, 46, 786-802 (2009)
  58. L. Massimo, C. Powers, P. Moore, L. Vesely, B. **Avants**, J. Gee, D. J. Libon & M. Grossman, "Neuroanatomy of Apathy and Disinhibition in Frontotemporal Lobar Degeneration", *DEMENTIA AND GERIATRIC COGNITIVE DISORDERS*, 27, 96-104 (2009)
  59. J. Pluta, B. B. **Avants**, S. Glynn, S. Awate, J. C. Gee & J. A. Detre, "Appearance and Incomplete Label Matching for Diffeomorphic Template Based Hippocampus Segmentation", *HIPPOCAMPUS*, 19, 565-571 (2009)
  60. P. T. Schoenemann, J. Monge, B. B. **Avants** & J. C. Gee, "An atlas of modern human cranial morphology constructed via non-rigid deformation analysis of high-resolution CT images.", *AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY*, 231 (2009)
  61. N. J. Tustison, B. B. **Avants** & J. C. Gee, "Directly Manipulated Free-Form Deformation Image Registration", *IEEE TRANSACTIONS ON IMAGE PROCESSING*, 18, 624-635 (2009)
  62. P. A. Yushkevich, B. B. **Avants**, J. Pluta, S. Das, D. Minkoff, D. Mechanic-Hamilton, S. Glynn, S. Pickup, W. Liu, J. C. Gee, M. Grossman & J. A. Detre, "A high-resolution computational atlas of the human hippocampus from postmortem magnetic resonance imaging at 9.4 T", *NEUROIMAGE*, 44, 385-398 (2009)
  63. B. **Avants**, J. T. Duda, J. Kim, H. Zhang, J. Pluta, J. C. Gee & J. Whyte, "Multivariate Analysis of Structural and Diffusion Imaging in Traumatic Brain Injury", *ACADEMIC RADIOLOGY*, 15, 1360-1375 (2008)
  64. B. B. **Avants**, C. L. Epstein, M. Grossman & J. C. Gee, "Symmetric diffeomorphic image registration with cross-correlation: Evaluating automated labeling of elderly and neurodegenerative brain", *MEDICAL IMAGE ANALYSIS*, 12, 26-41 (2008)
  65. M. Grossman, C. Anderson, A. Khan, B. **Avants**, L. Elman & L. McCluskey, "Impaired action knowledge in amyotrophic lateral sclerosis", *NEUROLOGY*, 71, 1396-1401 (2008)
  66. M. Grossman, C. Anderson, A. Khan, B. **Avants**, L. Elman & L. McCluskey, "Neural basis for

- impaired action knowledge in amyotrophic lateral sclerosis", *NEUROLOGY*, 70, A248 (2008)
67. J. Kim, B. **Avants**, S. Patel, J. Whyte, B. H. Coslett, J. Pluta, J. A. Detre & J. C. Gee, "Structural consequences of diffuse traumatic brain injury: A large deformation tensor-based morphometry study", *NEUROIMAGE*, 39, 1014-1026 (2008)
  68. L. M. Massimo, C. Anderson, P. Moore, B. **Avants**, D. Libon, B. Cynwyd & M. Grossman, "Neuroanatomical correlates of apathy and disinhibition in frontotemporal dementia", *NEUROLOGY*, 70, A443 (2008)
  69. P. T. Schoenemann, R. L. Holloway, B. B. **Avants** & J. C. Gee, "Endocast asymmetry in pongids assessed via non-rigid deformation analysis of high-resolution CT images.", *AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY*, 188 (2008)
  70. P. T. Schoenemann, R. L. Holloway, B. B. **Avants** & J. C. Gee, "The role of micro-morphological stress markers in the differential diagnosis of infectious bone diseases.", *AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY*, 188-189 (2008)
  71. T. J. Simon, Z. Wu, B. **Avants**, H. Zhang, J. C. Gee & G. T. Stebbins, "Atypical cortical connectivity and visuospatial cognitive impairments are related in children with chromosome 22q11.2 deletion syndrome", *BEHAVIORAL AND BRAIN FUNCTIONS*, 4 (2008)
  72. G. K. Aguirre, A. M. Komaromy, A. V. Cideciyan, D. H. Brainard, T. S. Aleman, A. J. Roman, B. B. **Avants**, J. C. Gee, M. Korczykowski, W. W. Hauswirth, G. M. Acland, G. D. Aguirre & S. G. Jacobson, "Canine and human visual cortex intact and responsive despite early retinal blindness from RPE65 mutation", *PLOS MEDICINE*, 4, 1117-1128 (2007)
  73. B. B. **Avants**, H. Hurt, J. M. Giannetta, C. L. Epstein, D. M. Shera, H. Rao, J. Wang & J. C. Gee, "Effects of heavy in utero cocaine exposure on adolescent caudate morphology", *PEDIATRIC NEUROLOGY*, 37, 275-279 (2007)
  74. Y. Fan, H. Rao, H. Hurt, J. Giannetta, M. Korczykowski, D. Shera, B. B. **Avants**, J. C. Gee, J. Wang & D. Shen, "Multivariate examination of brain abnormality using both structural and functional MRI", *NEUROIMAGE*, 36, 1189-1199 (2007)
  75. L. Ng, S. D. Pathak, C. Kuan, C. Lau, H. Dong, A. Sodt, C. Dang, B. **Avants**, P. Yushkevich, J. C. Gee, D. Haynor, E. Lein, A. Jones & M. Hawrylycz, "Neuroinformatics for genome-wide 3D gene expression mapping in the mouse brain", *IEEE-ACM TRANSACTIONS ON COMPUTATIONAL BIOLOGY AND BIOINFORMATICS*, 4, 382-393 (2007)
  76. H. Rao, J. Wang, J. Giannetta, M. Korczykowski, D. Shera, B. B. **Avants**, J. C. Gee, J. A. Detre & H. Hurt, "Altered resting cerebral blood flow in adolescents with in utero cocaine exposure revealed by perfusion functional MRI", *PEDIATRICS*, 120, E1245-E1254 (2007)
  77. P. T. Schoenemann, J. C. Gee, B. **Avants**, R. L. Holloway, J. Monge & J. Lewis, "Validation of plaster endocast morphology through 3D CT image analysis", *AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY*, 132, 183-192 (2007)
  78. P. T. Schoenemann, J. Monge, B. B. **Avants**, D. Glotzer & J. C. Gee, "Sex differences in cranial form assessed via non-rigid deformation analysis of high-resolution CT images.", *AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY*, 209 (2007)
  79. H. Zhang, B. B. **Avants**, P. A. Yushkevich, J. H. Woo, S. Wang, L. F. McCluskey, L. B. Elman, E. R. Melhem & J. C. Gee, "Differences: An example study using amyotrophic lateral sclerosis", *IEEE TRANSACTIONS ON MEDICAL IMAGING*, 26, 1585-1597 (2007)
  80. H. Zhang, B. B. **Avants**, P. A. Yushkevich, J. H. Woo, S. Wang, L. F. McCluskey, L. B. Elman, E. R. Melhem & J. C. Gee, "High-dimensional spatial normalization of diffusion tensor images improves the detection of white matter differences: an example study using amyotrophic lateral sclerosis.", *IEEE TRANS MED IMAGING*, 26, 1585-1597 (2007)



81. B. B. **Avants**, P. T. Schoenemann & J. C. Gee, "Lagrangian frame diffeomorphic image registration: Morphometric comparison of human and chimpanzee cortex", *MEDICAL IMAGE ANALYSIS*, 10, 397-412 (2006)
82. B. **Avants**, M. Grossman & J. Gee, "The correlation of cognitive decline with frontotemporal dementia induced annualized gray matter loss using diffeomorphic morphometry", *ALZHEIMER DISEASE & ASSOCIATED DISORDERS*, 19, S25-S28 (2005)
83. B. **Avants**, J. Gee, P. Schoenemann, J. Monge, J. Lewis & R. Holloway, "A new method for assessing endocast morphology: calculating local curvature from 3D CT images.", *AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY*, 67 (2005)
84. B. **Avants**, J. Gee, P. T. Schoenemann, J. Monge, J. E. Lewis & R. L. Holloway, "Validation of plaster endocast morphology through 3D CT image analysis", *AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY*, 56 (2004)
85. B. **Avants** & J. Gee, "Geodesic estimation for large deformation anatomical shape averaging and interpolation", *NEUROIMAGE*, 23, S139-S150 (2004)
86. P. T. Schoenemann, B. B. **Avants**, J. C. Gee, L. D. Glotzer & M. J. Sheehan, "Analysis of chimp-human brain differences via non-rigid deformation of 3D MR images", *AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY*, 174-175 (2004)
87. A. Dubb, R. Gur, B. **Avants** & J. Gee, "Characterization of sexual dimorphism in the human corpus callosum", *NEUROIMAGE*, 20, 512-519 (2003)
88. B. **Avants**, D. Soodak & G. Ruppeiner, "Measuring the electrical conductivity of the earth", *AMERICAN JOURNAL OF PHYSICS*, 67, 593-598 (1999)

## Conference Publications

1. Duda, J. T., Detre, J. A., Kim, J., Gee, J. C. and **Avants**, B. B. "Fusing functional signals by sparse canonical correlation analysis improves network reproducibility." *MICCAI*, Vol. 16(Pt 3), pp. 635-642, (2013)
2. P. Dhillon, B. M. Kandel, D. Wolk, J. C. Gee & B. **Avants**, "Prior-based Eigenanatomy for Classification of Autism Spectrum Disorder", *PRNI*, (2013)
3. B. M. Kandel, D. Wolk, J. C. Gee & B. **Avants**, "Predicting Cognitive Data From Medical Images Using Sparse Linear Regression ", *Inf. Process. Med. Imaging*, (2013)
4. B. **Avants**, P. Dhillon, B. M. Kandel, P. A. Cook, C. T. McMillan, M. Grossman & J. C. Gee, "Eigenanatomy improves detection power for longitudinal cortical change.", *Med Image Comput Comput Assist Interv*, 15, 206-213 (2012)
5. P. A. Cook, B. B. **Avants**, C. T. McMillan, J. Powers, J. C. Gee & M. Grossman, "Multimodal neuroimaging reveals gray and white matter associations with verbal fluency in frontotemporal degeneration", *DEMENTIA AND GERIATRIC COGNITIVE DISORDERS*, 33, 154-155 (2012)
6. B. **Avants**, P. A. Cook, C. McMillan, M. Grossman, N. J. Tustison, Y. Zheng & J. C. Gee, "Sparse unbiased analysis of anatomical variance in longitudinal imaging.", *Med Image Comput Comput Assist Interv*, 13, 324-331 (2010)
7. H. Wang, S. Das, J. Pluta, C. Craige, M. Altinay, B. **Avants**, M. Weiner, S. Mueller & P. Yushkevich, "Standing on the shoulders of giants: improving medical image segmentation via bias correction.", *Med Image Comput Comput Assist Interv*, 13, 105-112 (2010)
8. H. Sun, B. B. **Avants**, A. F. Frangi, F. Sukno, J. C. Geel & P. A. Yushkevich, "Cardiac medial modeling and time-course heart wall thickness analysis.", *Med Image Comput Comput Assist Interv*, 11, 766-773 (2008)

9. P. A. Yushkevich, B. B. **Avants**, J. Pluta, D. Minkoff, J. A. Detre, M. Grossman & J. C. Gee, "Shape-based alignment of hippocampal subfields: evaluation in postmortem MRI.", *Med Image Comput Comput Assist Interv*, 11, 510-517 (2008)
10. B. **Avants**, C. Anderson, M. Grossman & J. C. Gee, "Spatiotemporal normalization for longitudinal analysis of gray matter atrophy in frontotemporal dementia.", *Med Image Comput Comput Assist Interv*, 10, 303-310 (2007)
11. B. B. **Avants**, M. Grossman & J. C. Gee, "Symmetric diffeomorphic image registration: Evaluating automated labeling of elderly and neurodegenerative cortex and frontal lobe", , 4057, 50-57 (2006)
12. B. B. **Avants**, C. L. Epstein & J. C. Gee, "Geodesic image normalization and temporal parameterization in the space of diffeomorphisms", , 4091, 9-16 (2006)
13. Z. Song, N. Tustison, B. **Avants** & J. C. Gee, "Integrated graph cuts for brain MRI segmentation", , 4191, 831-838 (2006)
14. Z. Song, N. Tustison, B. **Avants** & J. C. Gee, "Integrated graph cuts for brain MRI segmentation.", *Med Image Comput Comput Assist Interv*, 9, 831-838 (2006)
15. N. J. Tustison, B. B. **Avants**, T. A. Sundaram, J. T. Duda & J. C. Gee, "A generalization of Free-Form Deformation image registration within the ITK finite element framework", , 4057, 238-246 (2006)
16. P. A. Yushkevich, B. B. **Avants**, L. Ng, M. Hawrylycz, P. D. Burstein, H. Zhang & J. C. Gee, "3D mouse brain reconstruction from histology using a coarse-to-fine approach", , 4057, 230-237 (2006)
17. B. **Avants**, C. Epstein & J. Gee, "Geodesic image interpolation: Parameterizing and interpolating spatiotemporal images", , 3752, 247-258 (2005)
18. P. Cook, H. Zhang, B. **Avants**, P. Yushkevich, D. Alexander, J. Gee, O. Ciccarelli & A. Thompson, "An automated approach to connectivity-based partitioning of brain structures", , 3749, 164-171 (2005)
19. T. Sundaram, B. **Avants** & J. Gee, "Towards a dynamic model of pulmonary parenchymal deformation: Evaluation of methods for temporal reparameterization of lung data", , 3750, 328-335 (2005)
20. T. A. Sundaram, B. B. **Avants** & J. C. Gee, "Towards a dynamic model of pulmonary parenchymal deformation: evaluation of methods for temporal reparameterization of lung data.", *Med Image Comput Comput Assist Interv*, 8, 328-335 (2005)
21. B. **Avants** & J. Gee, "Symmetric geodesic shape averaging and shape interpolation", , 3117, 99-110 (2004)
22. T. Sundaram, B. **Avants** & J. Gee, "A dynamic model of average lung deformation using capacity-based reparameterization and shape averaging of lung MR images", , 3217, 1000-1007 (2004)
23. B. **Avants** & J. Gee, "Formulation and evaluation of variational curve matching with prior constraints", , 2717, 21-30 (2003)
24. B. **Avants** & J. Gee, "The shape operator for differential analysis of images", , 2732, 101-113 (2003)
25. B. **Avants** & J. Gee, "Continuous curve matching with scale-space curvature and extrema-based scale selection", , 2695, 798-813 (2003)
26. B. **Avants** & J. Williams, "An adaptive minimal path generation technique for vessel tracking in CTA/CE-MRA volume images", 1935, 707-716 (2000)



## ■ Book Chapters

1. **Avants**, B., Williams, J.: An adaptive minimal path generation technique for vessel tracking in CTA/CE-MRA volume images. in Book Page: 707-716, 2000.
2. Insight Into Images: Theory for Segmentation, Registration and Image Analysis : Insight Into Images Principles and Practice for Segmentation, Registration and Image Analysis: Theory. Nonrigid Registration Chapter. A. K. Peters Ltd., Natick, MA, 2004.
3. Gee, J. C., Zhang, H., Dubb, A., **Avants**, B., Yushkevich, P., Duda, J. T.: Anatomy-based visualizations of diffusion tensor images of brain white matter. Visualization and Processing of Tensor Fields. Springer, 2005.