

Brian Avants

Brain mapping: theory & methods

300 Binney St, 95X55

Cambridge, MA 02142

☎ (415) 508 4437

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

🏠 [homepage](#)

My H-index: [48 \(link\)](#)

Pubmed: [\(papers\)](#)

Current Position

Biogen

2017 Lead of Imaging Analytics, Biomarkers Group

Research Interests

Brain mapping: brain structure, function, cognition and its interaction with environment and disease; visualization, modality integration, reproducibility, machine learning, longitudinal analysis, open data and science.

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*.

Professional Appointments

2016 Associate Director, Global Biomarker Discovery & Development, Biogen

2012–2016 Assistant Professor of Radiology, University of Pennsylvania

2008–2012 Research Associate, Radiology, University of Pennsylvania

2006–2008 Research Fellow, Radiology, University of Pennsylvania

Awards and Honors

2014 Best paper award with Nicholas Tustison at STACOM 2014 challenge.

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 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

- 2017 Topic Editor - Neuroimage special issue on Brain Parcellation
- 2015 Topic Editor - Frontiers in Neuroinformatics: [ITK topic](#)
- current 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
- present
- 2013– Consultant, American College of Radiology Head Injury Institute Information
- present Technology Committee
- 2010– [Insight ToolKit](#) Version 4 Development Leader and regular contributor to this
- present large-scale industry-academic collaborative effort sponsored by NLM
- 2011– International Neuroinformatics Coordinating Facility Registration and Atlasing
- present Task Force Member ([youtube video](#))
- 2006– Spatial Transformations Informatics Technology Initiative (SIFTI) member
- present
- 2006– Neuroimaging Informatics Tools and Resources Clearinghouse member
- present

Major Academic Collaborations

- 2016– Collaboration with Dr. Howie Rosen, UCSF Neurology, in multiple modality and
- present longitudinal analysis.
- 2013– Collaboration with Dr. Yvette Sheline, UPenn Center for Neuromodulation in
- present Depression and Stress (CNDS), in multiple modality and longitudinal analysis.

- 2006– present Collaboration with Dr. Martha Farah (UPenn) and Dr. Hallam Hurt (CHOP), understanding the effects of stress and poverty on brain development.
- 2006– present Collaboration with Dr. Murray Grossman (UPenn), multiple modality biomarkers for frontotemporal lobar degeneration and related disorders.
- 2013–2016 Collaboration with Dr. Ruben Gur (UPenn), Brain-Behavior Laboratory (BBL), in big data analysis of normal adolescent development and early signs of neuropsychiatric disorders.
- 2013–2016 Collaboration with Dr. Lyle Ungar (UPenn), analyzing the eigenspaces relating words, sentences and brain activity.

Major Academic Teaching Responsibilities

- Summer 2017 Summer advisor to Nicholas Cullen (B.S. in computer science) for Biogen Biomarkers internship on deep learning and multivariate analysis in neuroimaging of Alzheimer's Disease
- 2014–2016 Faculty technical advisor, with clinical advisor Branch Coslett, to Dorian Pustina, postdoctoral scientist studying machine learning applied to stroke; *Dr. Pustina is currently Director of Experimental Neuroimaging at the CHDI foundation for Huntington's disease research.*
- 2012–2017 Ph.D. Co-Advisor of Stathis Gennatas, UPenn Doctoral student, Neuroscience; *currently data scientist at UCSF working with Lyle Ungar.*
- 2010–2015 Ph.D. Advisor of Ben Kandel, UPenn Doctoral student, Bioengineering; Ben's work was awarded an oral presentation at IPMI-2013; *currently a data scientist at Picwell.*
- 2010–2015 Ph.D. Co-Advisor of Paramveer Dhillon, Doctoral student, UPenn Computer Science with Professor Lyle Ungar; Paramveer's work was awarded an oral presentation at PRNI-2013; *currently MIT post-doc studying large-scale networks.*
- 2012–2013 Organizer of Provost-sponsored UPenn Interdisciplinary Seminar Series on multi-modality brain mapping: See [brainomics link](#) for full list of activities

Media Coverage

- 2016 Performed confirmatory analyses of the amyloid PET findings in the PRIME dataset and created Figure 1 and cover image associated with [this publication](#).
- 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 & Primary Software Contributions

Programming Languages	Software Engineering & Programming - C++, CMake, R, Julia, Python, Bash, Rst, LaTeX, Git, Gerrit, others as needed
ANTs since 2008	Advanced Normalization Tools: C++ software used broadly in both academia & industry for medical image analytics; lead developer/designer .
ANTsR since 2012	R statistical programming language extension of ANTs with novel imaging-specific extensions; ideal for teaching; lead developer/designer .
ANTsPy 2017	Python statistical programming language extension of ANTs with novel imaging-specific extensions; ideal for teaching; <i>*new* with Nicholas Cullen</i> .
Neuroconductor since 2016	The neuroconductor platform provides new data science support that bridges novel medical imaging methods with the world's leading statistical platform; <i>founder and contributor</i> .
ITK since 2002	The Insight ToolKit - lead designer for registration framework for this seminal medical imaging analysis library.

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

Brain mapping & data science tutorials

Aug 2017	"ANTs and ANTsR for clinical applications", two day tutorial, Seattle Children's/University of Washington, Seattle, WA, Aug 2017, <i>organized by Murat Maga</i> .
Aug 2016	"ANTs and ANTsR in biostatistics", two day tutorial at MD Anderson, Houston, TX, Aug 2016, <i>organized by Hongtu Zhu</i> .
Jul 2016	Park City Mathematics Institute, Data science domain expert invitee, Park City, Utah, <i>organized by Rafe Mazzeo, Stanford University</i> .
Jul 2015	"ANTs and ANTsR", one day tutorial at USC Center for Imaging Genetics, Los Angeles, June 2015, <i>organized by Neda Jahanshad</i> .
May 2015	"ANTs and ANTsR in machine learning", two day tutorial with Nick Tustison, McGill University and Montreal Neurological Institute, Montreal, CN, <i>organized by Tal Arbel</i> .
Sep 2013	"Multivariate Medical Imaging Analysis with R", MICCAI 2013, Nagoya, Japan.

- Jul 2013 "ANTs & Eigenanatomy", Neuroimaging Training Program, UCLA, Los Angeles, CA.
- Sep 2011 "ITKv4 Image Registration Tutorial", MICCAI 2011, Toronto, Canada.
- Oct 2006 "Tutorial on Neuromorphometry", MICCAI 2006, Copenhagen, Denmark.

Lectures by Invitation

- Jun 2017 Invited lecture on translational brain mapping in neurodegenerative disease, Yale University, New Haven CT
- Mar 2017 Lecture of multiple modality analysis of Alzheimer's disease, Duke University, Durham, NC
- Apr 2017 Platform presentation at ADPD 2017, Vienna, Austria
- Jun 2015 "Large-scale, predictive analytics for M³ pediatric neuroimaging", International Society for Magnetic Resonance in Medicine Meeting, Toronto, CN
- May 2015 Invited to deliver ANTs introduction talk at University of California, San Diego. San Diego, CA
- Nov 2014 "Functional Imaging Analysis with R", University of South Carolina
- Aug 2014 "Big Image Registration", Frontiers in Human Brain Mapping Workshop, Princeton University
- Apr 2014 "Eigenwords & Eigenanatomy for Decoding Neural Representations of Semantics", HRL, Malibu, CA
- Feb 2014 "ANTs & Eigenanatomy for Integrative Brain Mapping ", University of Calgary, Calgary, Alberta
- Mar 2013 "Multi-Modality Analysis", CMROI Workshop, University of Pennsylvania, Philadelphia, PA
- May 2012 "Early Home Environment Impacts Cortical Thickness in Young Adulthood", Chinese Academy of Sciences, Beijing, China
- Oct 2012 "A Unified Image Registration Framework for ITKv4", National Library of Medicine, Bethesda, MD
- Jul 2012 "A Unified Registration Framework for ITKv4," WBIR 2012, Nashville, TN
- Oct 2012 "Early Home Environment Impacts Cortical Thickness in Young Adulthood," Society for Neuroscience Press Conference, New Orleans, LA
- May 2012 "Multivariate Methods for Integrating Multiple Modalities in Brain Mapping", Incheon National University, Incheon, South Korea
- Jun 2012 "Eigenanatomy Methods for Multivariate Brain Mapping", University of California, San Francisco
- Jan 2011 "Open Source Neonatal Brain Mapping," Washington University at St. Louis, St. Louis, MO
- Nov 2011 "Multivariate analyses improve detection power for cortical longitudinal change in dementia", Society for Neuroscience Meeting, Washington D.C.
- Dec 2011 "Modern analytics for neuroimaging," University of California, Los Angeles

- Feb 2011 "Multivariate methods in neuroimaging", Washington Univ. at St. Louis
- Sep 2010 "Open Source in Medical Imaging" Inst. of Automation, Chinese Academy of Sciences, Beijing, China
- Jun 2010 "Open Source Image Registration", National Library of Medicine, Bethesda, MD
- Sep 2010 "Multivariate Longitudinal Correlation of Atrophy in White Matter and Gray Matter" MICCAI, Beijing, China
- Jul 2010 "Advanced ITK-Based Image Registration," NLM, Bethesda, MD
- Sep 2010 "Sparse Unbiased Analysis of Anatomical Variance in Longitudinal Neuroimaging," MICCAI 2010, Beijing China. (45 of 786 submissions accepted for oral presentation)
- Jun 2009 "Grammatical comprehension and longitudinal adolescent brain development: a multivariate DTI and T1 analysis," Human Brain Mapping 2009, San Francisco, CA
- Jul 2009 "Democratizing Hippocampus Labeling," Columbia University, NY, NY
- Jul 2009 "Multivariate Analysis of the Adolescent Brain and its Association with Language Development," Columbia University, NY, NY
- Mar 2009 "Follow-Up on Effects of Prenatal Cocaine Exposure on the Young Adult Brain," Eastern SPR, Philadelphia, PA
- Jul 2009 "Multivariate Methods and Applications for Neuroimaging," SRI, Menlo Park, CA
- Jun 2008 "The Longitudinal Effect of Neurodegeneration of Language Network Neuroanatomy and Cognition," Pendergrass Symposium, Univ. of Penn. Philadelphia, PA
- Sep 2008 "Template-based Brain Mapping with Diffeomorphisms," Janelia Farm, Ashburn, Virginia
- Oct 2008 "Multivariate Template-based Retinotopic Mapping," Stanford Vision Science Group, Stanford University, Palo Alto, CA
- Apr 2007 "Symmetric Shape Averaging in the Diffeomorphic Space", International Symposium Biomedical Imaging, Washington DC
- Oct 2007 "Spatiotemporal Normalization for Longitudinal Analysis of Gray Matter Atrophy in Frontotemporal Dementia," MICCAI 2007, Brisbane, Australia
- Apr 2006 "Geodesic shape averaging," IEEE International Symposium on Biomedical Imaging 2006, Alexandria, VA
- Nov 2007 "Mapping Statistical Patterns in Medical Images via Diffeomorphisms," Univ. of Pennsylvania, CIS 520 lecture, Philadelphia, PA
- Jul 2005 "Shape Optimizing Diffeomorphisms in Medical Imaging," ISI, Utrecht, NL

Grants

- 10/2014-9/2019 The Imaging Genomics of Pediatric Executive Function, NIH, K01ES025432-01, (Avants, Brian, PI), \$275,000/annual direct costs, 80% effort (Big data to knowledge (BD2K) research grant.)

- 08/01/15- Multimodal brain maturation indices modulating psychopathology and neurocognition, NIH, R01MH107235-01, (Avants, Brian, collaborator, Gur, Ruben, PI), 05/31/18 \$275,000/annual direct costs, 5% effort (via cost sharing with K01.)
- 9/2013- Neuroscience Neuroimaging Center, NIH, P30-NS045839-07, (Detre, John, 8/2018 M.D., PI), \$499,727/annual direct costs, 10% effort (Role in grant: Collaborator, To provide support for technical aspects of neuroimaging using MRI.)
- 2014 IARPA-sponsored Knowledge Representation in Neural Systems (KRNS), IARPA-BAA-12-05, 50% effort (Role in grant: Image Analysis Lead)
- 9/2012- Age, Hearing Loss, And Sentence Comprehension: Neural Correlates, National 7/2013 Institute On Aging/Nih/Dhhs, 5-R01-AG-038490-05, (Murray Grossman, PI), \$291,978/annual direct costs (Role in grant: Co-PI)
- 9/2011- Continued Development and Maintenance of ITK-SNAP 3D Image Segmen- 8/2015 tation Software, NIH, R01-EB014346-01, (Yushkevich, Paul A., Ph.D., PI), \$350,824/annual direct costs (Role in grant: Collaborator)
- 9/2010- TDP-43 Proteinopathies in ALS-Dementia, NIH, P01-AG032953-02, (Lee, Vir- 8/2015 ginia/Grossman, Murray, PI), \$729,272/annual direct costs (Role in grant: Col- laborator)
- 6/2010- Fundamental Refactoring Of Deformable Image Registration In Itk With Dis- 6/2013 tributed Computing And Gpu Acceleration, National Library Of Medicine, HHSN276201000492P, (JAMES C GEE, PI), \$472,861/annual direct costs (Role in grant: Co-PI)
- 8/2007- In Utero Cocaine Exposure: Adolescent & Young Adult Neurocognitive Out- 4/2013 come, Children's Hospital of Philadelphia, R01-DA14129-08, (Gee, James C., Ph.D., PI), \$102,515/annual direct costs (Role in grant: Collaborator, To ex- plore the effects of gestational cocaine exposure on neurocognitive outcome of adolescents and young adults)
- 2/2011- Longitudinal Multi-model Neuroimaging of Natural Recovery after Traumatic 1/2012 Brain Injury: A Pilot Study, Moss Rehab Research Institute/NIH, (**Avants**, Brian Ph.D., PI), \$7,764/annual direct costs (Role in grant: PI)
- 6/2010- Parkinsons Disease & Dementia, NIH, P50-NS053488-04S1, (Tro- 5/2012 janowski/Grossman, PI), \$132,641/annual direct costs (Role in grant: Collaborator)
- 9/2009- Pediatric Template Of Brain Perfusion, National Institute Of Mental 5/2010 Health/Nih/Dhhs, 3-R01-MH-080892-01A2S1, (JiongJiong Wang, PI) \$0/annual direct costs, (Role in grant: Co-PI)
- 9/2009- Tract-Specific Analysis of Brain White Matter, NIH, R01-NS065347-02, (Gee, 8/2012 James C., Ph.D., PI), \$370,667/annual direct costs, (Role in grant: Collaborator)
- 9/2008- Advanced Neuroimages Registration Methods: Effects of Prenatal Cocaine Ex- 9/2011 posure, NIH, (James C. Gee, PI: Brian **Avants**, Co-Investigator), \$354,375/an- nual direct costs, (Role in grant: Co-PI)
- 6/2008- The Longitudinal Effect of Neurodegeneration onLanguage-Network Neu- 1/2011 roanatomy and Cognition, University of Pennsylvania, Institute of Aging, (James C. Gee, PI: Brian **Avants**, Co-Investigator), (Role in grant: Co-PI)

- 4/2007- Long Term Effects of Prenatal Cocaine Exposure, NIH, (Hallam Hurt, PI), (Role in grant: Research Scientist)
- 1/2011
- 4/2006- Shape Optimizing Diffeomorphisms for Computational Biology, NIH - UCLA
- 3/2010 Center for Computational Biology, R01-EB006266, (James C. Gee, PI) (Role in grant: Research Scientist)
- 8/2004- Surface-based Cortical Analysis in ITK: Segmentation, Conformal Flattening and Statistics, NLM-NIH ITK Development Grant, (James C. Gee, PI, Role in grant: Co-PI, Open source development)
- 6/2009
- 9/2002- Bioengineering Training in Cardiovascular Pathophysiology, Institute for Medicine and Engineering Training Grant, University of Pennsylvania, Philadelphia, PA, (Peter Davies, PI), (Role in grant: Trainee)
- 6/2010

Articles Under Review/Development

1. *Amyloid- β positive subjects exhibit network-specific longitudinal reductions in spontaneous brain activity*, first author, (submitted)
2. *A reproducible analysis pipeline for population studies of ASL-based cerebral blood flow*, last author, (in process)
3. *Environmental influences on early childhood hippocampal growth*, with Martha Farah and Hallam Hurt, (in process)
4. *Joint Fusion for optimal template creation*, with Nicholas J Tustison, (in process)
5. *The ANTs longitudinal cortical thickness pipeline*, with Nicholas J Tustison, (submitted)

Journal Publications

1. See these links for latest papers: [Google scholar search](#) and [Pubmed search](#)
2. Muschelli, J.; Fortin, J. P.; Gherman, A; **Avants** B. B.; Whitcher, B.; Caffo B. & Crainiceanu C. (2017), *Neuroconductor: An R platform for Neuroimaging*, Biostatistics (under review)
3. Pustina, D.; Coslett, H. B.; Ungar, L.; Faseyitan, O. K.; Medaglia, J. D.; **Avants**, B. B.; Schwartz, M. F., (2017), *Enhanced estimations of post-stroke aphasia severity using stacked multimodal predictions*, Human Brain Mapping.
4. Tustison, N. J.; Holbrook, A. J.; **Avants**, B. B.; Roberts, J. M.; Cook, P. A.; Reagh, Z. M.; Stone, J. R.; Gillen, D. L.; Yassa, M. A., (2017), *The ANTs Longitudinal Cortical Thickness Pipeline*, bioRxiv.
5. Pustina, D.; **Avants**, B. B.; Faseyitan, O.; Medaglia, J.; Coslett, H. B., (2017), *Improved accuracy of lesion to symptom mapping with multivariate sparse canonical correlations*, Neuropsychologia. (in press)
6. Maga, M. A.; Tustison, N. J.; **Avants**, B. B. (2017), *A population level atlas of Mus musculus craniofacial skeleton and automated image-based shape analysis*, Journal of Anatomy.
7. Gennatas, E. D.; **Avants**, B. B.; Wolf, D. H.; Satterthwaite, T. D.; Ruparel, K.; Ciric, R.; Hakonarson, H.; Gur, R. E.; Gur, R. C., (2017), *Age-related effects and sex differences in gray matter density, volume, mass, and cortical thickness from childhood to young adulthood*, Journal of Neuroscience.
8. Xie, L.; Pluta, J. B.; Das, S. R.; Wisse, L. E. M.; Wang, H.; Mancuso, L.; Klot, D.; **Avants**, B. B.; Ding, S.; Manjón, J. V.; Yushkevich, P., (2017), *Multi-template analysis of human perirhinal cortex in brain MRI: Explicitly accounting for anatomical variability*, Neuroimage.

9. Olm, C. A.; Kandel, B. M.; **Avants**, B. B.; Detre, J. A.; Gee, J. C.; Grossman, M.; McMillan, C. T., (2016), *Arterial spin labeling perfusion predicts longitudinal decline in semantic variant primary progressive aphasia*, Journal of Neurology.
10. Kandel, B. M.; **Avants**, B. B.; Gee, J. C.; McMillan, C. T.; Erus, G.; Doshi, J.; Davatzikos, C.; Wolk, D. A., (2016), *White matter hyperintensities are more highly associated with preclinical Alzheimer's disease than imaging and cognitive markers of neurodegeneration*, Alzheimer's & Dementia: Diagnosis, Assessment & Disease Monitoring.
11. Legant, W. R.; Shao, L.; Grimm, J. B.; Brown, T. A.; Milkie, D. E.; **Avants**, B. B.; Lavis, L. D.; Betzig, E., (2016), *High-density three-dimensional localization microscopy across large volumes*, Nature methods.
12. Pustina, D.; Coslett, H.; Turkeltaub, P. E.; Tustison, N. J.; Schwartz, M. F.; Avants, B. B., (2016), *Automated segmentation of chronic stroke lesions using LINDA: lesion identification with neighborhood data analysis*, Human Brain Mapping.
13. Betancourt, L.; **Avants**, B. B.; Farah, M. J.; Brodsky, N. L.; Wu, J.; Ashtari, M.; & Hurt, H., (2016), *Effect of socioeconomic status (SES) disparity on neural development in female African-American infants at age 1 month*, Developmental Science.
14. **Avants**, B. B.; Hackman, D.; Betancourt, L.; Lawson, G. M.; Hurt, H.; Farah, M. J. (2016), *Relation of Childhood Home Environment to Cortical Thickness in Late Adolescence: Specificity of Experience and Timing*, PLOS One.
15. **Avants**, B. B.; Johnson, H. J.; Tustison, N. J., (2015), *Neuroinformatics and the The Insight ToolKit*, Frontiers in neuroinformatics 9.
16. Pustina, D.; **Avants**, B. B.; Sperling, M.; Gorniak, R.; He, X.; Doucet, G.; Barnett, P.; Mintzer, S.; Sharan, A. & Tracy, J. (2015), *Predicting the laterality of temporal lobe epilepsy from PET, MRI, and DTI: A multimodal study*, Neuroimage Clin, 9, 20–31.
17. **Avants**, B. B.; Duda, J. T.; Kilroy, E.; Krasileva, K.; Jann, K.; Kandel, B. T.; Tustison, N. J.; Yan, L.; Jog, M.; Smith, R.; Wang, Y.; Dapretto, M. & Wang, D. J. J. (2015), *The pediatric template of brain perfusion*, Sci Data 2, 150003.
18. Wu, J.; Awate, S. P.; Licht, D. J.; Clouchoux, C.; du Plessis, A. J.; **Avants**, B. B.; Vossough, A.; Gee, J. C. & Limperopoulos, C. (2015), *Assessment of MRI-Based Automated Fetal Cerebral Cortical Folding Measures in Prediction of Gestational Age in the Third Trimester*, AJNR Am J Neuroradiol 36(7), 1369–1374.
19. Isgum, I.; Benders, M. J. N. L.; **Avants**, B.; Cardoso, M. J.; Counsell, S. J.; Gomez, E. F.; Gui, L.; HÅsppi, P. S.; Kersbergen, K. J.; Makropoulos, A.; Melbourne, A.; Moeskops, P.; Mol, C. P.; Kuklisova-Murgasova, M.; Rueckert, D.; Schnabel, J. A.; Srhoj-Egekher, V.; Wu, J.; Wang, S.; de Vries, L. S. & Viergever, M. A. (2015), *Evaluation of automatic neonatal brain segmentation algorithms: The NeoBrainS12 challenge*, Med Image Anal 20(1), 135–151.
20. Kandel, B. M.; Wang, D. J. J.; Detre, J. A.; Gee, J. C. & **Avants**, B. B. (2015), *Decomposing cerebral blood flow MRI into functional and structural components: a non-local approach based on prediction*, Neuroimage 105, 156–170.
21. Kandel, B. M.; **Avants**, B. B.; Gee, J. C.; Arnold, S. E. & Wolk, D. A. (2015), *Neuropsychological Testing Predicts Cerebrospinal Fluid Amyloid- β in Mild Cognitive Impairment*, J Alzheimers Dis 46(4), 901–912.
22. Kandel, B. M.; Wang, D. J. J.; Gee, J. C. & **Avants**, B. B. (2015), *Eigenanatomy: sparse dimensionality reduction for multi-modal medical image analysis*, Methods 73, 43–53.
23. Adler, D. H.; Pluta, J.; Kadivar, S.; Craige, C.; Gee, J. C.; **Avants**, B. B. & Yushkevich, P. A. (2014), *Histology-derived volumetric annotation of the human hippocampal subfields in*

- postmortem MRI*, Neuroimage 84, 505–523.
24. **Avants**, B. B.; Tustison, N. J.; Stauffer, M.; Song, G.; Wu, B. & Gee, J. C. (2014), *The Insight ToolKit image registration framework*, Front Neuroinform 8, 44.
 25. **Avants**, B. B.; Libon, D. J.; Rascovsky, K.; Boller, A.; McMillan, C. T.; Massimo, L.; Coslett, H. B.; Chatterjee, A.; Gross, R. G. & Grossman, M. (2014), *Sparse canonical correlation analysis relates network-level atrophy to multivariate cognitive measures in a neurodegenerative population*, Neuroimage 84, 698–711.
 26. Cook, P. A.; McMillan, C. T.; **Avants**, B. B.; Peelle, J. E.; Gee, J. C. & Grossman, M. (2014), *Relating brain anatomy and cognitive ability using a multivariate multimodal framework*, Neuroimage 99, 477–486.
 27. Dhillon, P. S.; Wolk, D. A.; Das, S. R.; Ungar, L. H.; Gee, J. C. & **Avants**, B. B. (2014), *Subject-specific functional parcellation via Prior Based Eigenanatomy*, Neuroimage 99, 14–27.
 28. McMillan, C. T.; **Avants**, B. B.; Cook, P.; Ungar, L.; Trojanowski, J. Q. & Grossman, M. (2014), *The power of neuroimaging biomarkers for screening frontotemporal dementia*, Hum. Brain Mapp. 35(9), 4827–4840.
 29. 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. & Grossman, M. (2014), *Genetic and neuroanatomic associations in sporadic frontotemporal lobar degeneration*, Neurobiol. Aging 35(6), 1473–1482.
 30. 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. (2014), *Large-scale evaluation of ANTs and FreeSurfer cortical thickness measurements*, Neuroimage 99, 166–179.
 31. Hopkins, W. D. & **Avants**, B. B. (2013), *Regional and Hemispheric Variation in Cortical Thickness in Chimpanzees (Pan troglodytes)*, J. Neurosci. 33(12), 5241–5248.
 32. Kim, J.; **Avants**, B.; Whyte, J. & Gee, J. C. (2013), *Methodological considerations in longitudinal morphometry of traumatic brain injury*, Front Hum Neurosci 7, 52.
 33. Lawson, G. M.; Duda, J. T.; **Avants**, B. B.; Wu, J. & Farah, M. J. (2013), *Associations between children's socioeconomic status and prefrontal cortical thickness*, Dev Sci 16(5), 641–652.
 34. McMillan, C. T.; **Avants**, B.; Irwin, D. J.; Toledo, J. B.; Wolk, D. A.; Van Deerlin, V. M.; Shaw, L. M.; Trojanowski, J. Q. & Grossman, M. (2013), *Can MRI screen for CSF biomarkers in neurodegenerative disease?*, Neurology 80(2), 132–138.
 35. McMillan, C. T.; Irwin, D. J.; **Avants**, B. B.; Powers, J.; Cook, P. A.; Toledo, J. B.; McCarty Wood, E.; Van Deerlin, V. M.; Lee, V. M.-Y.; Trojanowski, J. Q. & Grossman, M. (2013), *White matter imaging helps dissociate tau from TDP-43 in frontotemporal lobar degeneration*, J. Neurol. Neurosurg. Psychiatry.
 36. Tustison, N. J. & **Avants**, B. B. (2013), *Explicit B-spline regularization in diffeomorphic image registration*, Front Neuroinform 7, 39.
 37. Tustison, N. J.; Johnson, H. J.; Rohlfing, T.; Klein, A.; Ghosh, S. S.; Ibanez, L. & **Avants**, B. B. (2013), *Instrumentation bias in the use and evaluation of scientific software: recommendations for reproducible practices in the computational sciences*, Front Neurosci 7, 162.
 38. Weber, M. J.; Detre, J. A.; Thompson-Schill, S. L. & **Avants**, B. B. (2013), *Reproducibility of functional network metrics and network structure: a comparison of task-related BOLD, resting ASL with BOLD contrast, and resting cerebral blood flow*, Cogn. Affect. Behav. Neurosci. 13(3), 627–640.

39. Badea, A.; Gewalt, S.; **Avants**, B. B.; Cook, J. J. & Johnson, G. A. (2012), *Quantitative mouse brain phenotyping based on single and multispectral MR protocols*, Neuroimage 63(3), 1633–1645.
40. Cook, P. A.; **Avants**, B. B.; McMillan, C. T.; Powers, J.; Gee, J. C. & Grossman, M. (2012), *Multimodal neuroimaging reveals gray and white matter associations with verbal fluency in frontotemporal degeneration*, Dement. Geriatr. Cogn. Disord. 33(1), 154–155.
41. Das, S. R.; **Avants**, B. B.; Pluta, J.; Wang, H.; Suh, J. W.; Weiner, M. W.; Mueller, S. G. & Yushkevich, P. A. (2012), *Measuring longitudinal change in the hippocampal formation from in vivo high-resolution T2-weighted MRI*, Neuroimage 60(2), 1266–1279.
42. Datta, R.; Lee, J.; Duda, J.; **Avants**, B. B.; Vite, C. H.; Tseng, B.; Gee, J. C.; Aguirre, G. D. & Aguirre, G. K. (2012), *A Digital Atlas of the Dog Brain*, PLOS ONE 7(12).
43. Ghosh, S. S.; Klein, A.; **Avants**, B. & Millman, K. J. (2012), *Learning from open source software projects to improve scientific review*, Front Comput Neurosci 6, 18.
44. Gross, R. G.; McMillan, C. T.; Chandrasekaran, K.; Dreyfuss, M.; Ash, S.; **Avants**, B.; Cook, P.; Moore, P.; Libon, D. J.; Siderowf, A. & Grossman, M. (2012), *Sentence processing in Lewy body spectrum disorder: The role of working memory*, Brain Cogn. 78(2), 85–93.
45. Hanson, J. L.; Chung, M. K.; **Avants**, B. B.; Rudolph, K. D.; Shirtcliff, E. A.; Gee, J. C.; Davidson, R. J. & Pollak, S. D. (2012), *Structural Variations in Prefrontal Cortex Mediate the Relationship between Early Childhood Stress and Spatial Working Memory*, J. Neurosci. 32(23), 7917–7925.
46. Hanson, J. L.; Suh, J. W.; Nacewicz, B. M.; Sutterer, M. J.; Cayo, A. A.; Stodola, D. E.; Burghy, C. A.; Wang, H.; **Avants**, B. B.; Yushkevich, P. A.; Essex, M. J.; Pollak, S. D. & Davidson, R. J. (2012), *Robust Automated Amygdala Segmentation via Multi-Atlas Diffeomorphic Registration*, Front Neurosci 6, 166.
47. Hurst, D. R.; Schoenemann, P. T.; Loyet, M. M.; **Avants**, B. B. & Gee, J. C. (2012), *How well does endocranial morphology predict behavioral differences in primates?*, Am. J. Phys. Anthropol. 147(54), 171.
48. Jain, V.; Duda, J.; **Avants**, B.; Giannetta, M.; Xie, S. X.; Roberts, T.; Detre, J. A.; Hurt, H.; Wehrli, F. W. & Wang, D. J. J. (2012), *Longitudinal Reproducibility and Accuracy of Pseudo-Continuous Arterial Spin-labeled Perfusion MR Imaging in Typically Developing Children*, Radiology 263(2), 527–536.
49. Libon, D. J.; McMillan, C.; **Avants**, B.; Boller, A.; Morgan, B.; Burkholder, L.; Chandrasekaran, K.; Elman, L.; McCluskey, L. & Grossman, M. (2012), *Deficits in Concept Formation in Amyotrophic Lateral Sclerosis*, Neuropsychology 26(4), 422–429.
50. Loyet, M. M.; Schoenemann, P. T.; **Avants**, B. B. & Gee, J. C. (2012), *Associations between localized variation in brain anatomy and social behavior in healthy human subjects*, Am. J. Phys. Anthropol. 147(54), 196.
51. Rohlfing, T. & **Avants**, B. (2012), *"Nonparametric Local Smoothing" is not image registration*, BMC Res Notes 5, 610.
52. Tustison, N. J.; **Avants**, B. B.; Cook, P. A.; Kim, J.; Whyte, J.; Gee, J. C. & Stone, J. R. (2012), *Logical circularity in voxel-based analysis: Normalization strategy may induce statistical bias*, Hum. Brain Mapp..
53. Ashtari, M.; **Avants**, B.; Cyckowski, L.; Cervellione, K. L.; Roofeh, D.; Cook, P.; Gee, J.; Sevy, S. & Kumra, S. (2011), *Medial temporal structures and memory functions in adolescents with heavy cannabis use*, J. Psychiatr. Res. 45(8), 1055–1066.
54. **Avants**, B. B.; Tustison, N. J.; Song, G.; Cook, P. A.; Klein, A. & Gee, J. C. (2011), A

- reproducible evaluation of ANTs similarity metric performance in brain image registration*, Neuroimage 54(3), 2033–2044.
55. **Avants**, B. B.; Tustison, N. J.; Wu, J.; Cook, P. A. & Gee, J. C. (2011), *An Open Source Multivariate Framework for n-Tissue Segmentation with Evaluation on Public Data*, Neuroinformatics 9(4), 381–400.
 56. Boller, A.; Libon, D.; Rascovsky, K.; Gross, R. G.; Dreyfuss, M.; **Avants**, B.; Massimo, L.; Moore, P.; Kitain, J.; Coslett, H.; Chatterjee, A. & Grossman, M. (2011), *Philadelphia Brief Assessment of Cognition (PBAC): A Validated Screening Measure for Dementia*, Neurology 76(9, 4), A511.
 57. Das, S. R.; Mechanic-Hamilton, D.; Pluta, J.; Korczykowski, M.; Detre, J. A. & Yushkevich, P. A. (2011), *Heterogeneity of functional activation during memory encoding across hippocampal subfields in temporal lobe epilepsy*, Neuroimage 58(4), 1121–1130.
 58. Morgan, B.; Gross, R. G.; Clark, R.; Dreyfuss, M.; Boller, A.; Camp, E.; Liang, T.-W.; **Avants**, B.; McMillan, C. T. & Grossman, M. (2011), *Some is not enough: Quantifier comprehension in corticobasal syndrome and behavioral variant frontotemporal dementia*, Neuropsychologia 49(13), 3532–3541.
 59. Murphy, K.; van Ginneken, B.; Reinhardt, J. M.; Kabus, S.; Ding, K.; Deng, X.; Cao, K.; Du, K.; Christensen, G. E.; Garcia, V.; Vercauteren, T.; Ayache, N.; Commowick, O.; Malandain, G.; Glocker, B.; Paragios, N.; Navab, N.; Gorbunova, V.; Sporring, J.; de Bruijne, M.; Han, X.; Heinrich, M. P.; Schnabel, J. A.; Jenkinson, M.; Lorenz, C.; Modat, M.; McClelland, J. R.; Ourselin, S.; Muenzing, S. E. A.; Viergever, M. A.; De Nigris, D.; Collins, D. L.; Arbel, T.; Peroni, M.; Li, R.; Sharp, G. C.; Schmidt-Richberg, A.; Ehrhardt, J.; Werner, R.; Smeets, D.; Loeckx, D.; Song, G.; Tustison, N.; **Avants**, B.; Gee, J. C.; Staring, M.; Klein, S.; Stoel, B. C.; Urschler, M.; Werlberger, M.; Vandemeulebroucke, J.; Rit, S.; Sarrut, D. & Pluim, J. P. W. (2011), *Evaluation of Registration Methods on Thoracic CT: The EMPIRE10 Challenge*, IEEE Trans Med Imaging 30(11), 1901–1920.
 60. Schoenemann, P. T.; Holloway, R.; Monge, J.; **Avants**, B. & Gee, J. (2011), *Differences in endocranial shape between Homo and Pongids assessed through non-rigid deformation analysis of high-resolution CT images*, Am. J. Phys. Anthropol. 144(52), 265–266.
 61. Tustison, N.; **Avants**, B.; Cook, P.; Kim, J.; Whyte, J.; Gee, J.; Ahlers, S. & Stone, J. (2011), *Multivariate analysis of diffusion tensor imaging and cortical thickness maps in a traumatic brain injury (TBI) cohort using Advanced Normalization Tools (ANTs)*, J. Neurotrauma 28(6), A111.
 62. Tustison, N. J.; **Avants**, B. B.; Flors, L.; Altes, T. A.; de Lange, E. E.; Mugler, III, J. P. & Gee, J. C. (2011), *Ventilation-Based Segmentation of the Lungs Using Hyperpolarized He-3 MRI*, J. Magn. Reson. Imaging 34(4), 831–841.
 63. Tustison, N. J.; **Avants**, B. B.; Siqueira, M. & Gee, J. C. (2011), *Topological Well-Composedness and Glamorous Glue: A Digital Gluing Algorithm for Topologically Constrained Front Propagation*, IEEE Trans Image Process 20(6), 1756–1761.
 64. Wang, H.; Das, S. R.; Suh, J. W.; Altinay, M.; Pluta, J.; Craige, C.; **Avants**, B.; Yushkevich, P. A. & Initia, A. D. N. (2011), *A learning-based wrapper method to correct systematic errors in automatic image segmentation: Consistently improved performance in hippocampus, cortex and brain segmentation*, Neuroimage 55(3), 968–985.
 65. Ash, S.; McMillan, C.; Gunawardena, D.; **Avants**, B.; Morgan, B.; Khan, A.; Moore, P.; Gee, J. & Grossman, M. (2010), *Speech errors in progressive non-fluent aphasia*, Brain Lang. 113(1), 13–20.

66. **Avants**, B. B.; Cook, P. A.; Ungar, L.; Gee, J. C. & Grossman, M. (2010), *Dementia induces correlated reductions in white matter integrity and cortical thickness: A multivariate neuroimaging study with sparse canonical correlation analysis*, Neuroimage 50(3), 1004–1016.
67. **Avants**, B. B.; Yushkevich, P.; Pluta, J.; Minkoff, D.; Korczykowski, M.; Detre, J. & Gee, J. C. (2010), *The optimal template effect in hippocampus studies of diseased populations*, Neuroimage 49(3), 2457–2466.
68. Farag, C.; Troiani, V.; Bonner, M.; Powers, C.; **Avants**, B.; Gee, J. & Grossman, M. (2010), *Hierarchical Organization of Scripts: Converging Evidence from fMRI and Frontotemporal Degeneration*, Cereb. Cortex 20(10), 2453–2463.
69. Grossman, M.; Eslinger, P. J.; Troiani, V.; Anderson, C.; **Avants**, B.; Gee, J. C.; McMillan, C.; Massimo, L.; Khan, A. & Antani, S. (2010), *The role of ventral medial prefrontal cortex in social decisions Converging evidence from fMRI and frontotemporal lobar degeneration*, Neuropsychologia 48(12), 3505–3512.
70. Gunawardena, D.; Ash, S.; McMillan, C.; **Avants**, B.; Gee, J. & Grossman, M. (2010), *Why are patients with progressive nonfluent aphasia nonfluent?*, Neurology 75(7), 588–594.
71. Hanson, J. L.; Chung, M. K.; **Avants**, B. B.; Shirtcliff, E. A.; Gee, J. C.; Davidson, R. J. & Pollak, S. D. (2010), *Early Stress Is Associated with Alterations in the Orbitofrontal Cortex: A Tensor-Based Morphometry Investigation of Brain Structure and Behavioral Risk*, J. Neurosci. 30(22), 7466–7472.
72. Kim, J.; Whyte, J.; Patel, S.; **Avants**, B.; Europa, E.; Wang, J.; Slattery, J.; Gee, J. C.; Coslett, H. B. & Detre, J. A. (2010), *Resting Cerebral Blood Flow Alterations in Chronic Traumatic Brain Injury: An Arterial Spin Labeling Perfusion fMRI Study*, J. Neurotrauma 27(8), 1399–1411.
73. Klein, A.; Ghosh, S. S.; **Avants**, B.; Yeo, B. T. T.; Fischl, B.; Ardekani, B.; Gee, J. C.; Mann, J. J. & Parsey, R. V. (2010), *Evaluation of volume-based and surface-based brain image registration methods*, Neuroimage 51(1), 214–220.
74. Rao, H.; Betancourt, L.; Giannetta, J. M.; Brodsky, N. L.; Korczykowski, M.; **Avants**, B. B.; Gee, J. C.; Wang, J.; Hurt, H.; Detre, J. A. & Farah, M. J. (2010), *Early parental care is important for hippocampal maturation: Evidence from brain morphology in humans*, Neuroimage 49(1), 1144–1150.
75. Schoenemann, P. T.; Monge, J.; Holloway, R. L.; **Avants**, B. B. & Gee, J. C. (2010), *Creating statistical atlases of modern primate endocranial morphology using non-rigid deformation analysis of high-resolution CT images*, Am. J. Phys. Anthropol.(50), 208–209.
76. Tustison, N. J.; **Avants**, B. B.; Cook, P. A.; Zheng, Y.; Egan, A.; Yushkevich, P. A. & Gee, J. C. (2010), *N4ITK: improved N3 bias correction*, IEEE Trans Med Imaging 29(6), 1310–1320.
77. Wang, D. J. J.; Bi, X.; **Avants**, B. B.; Meng, T.; Zuehlsdorff, S. & Detre, J. A. (2010), *Estimation of Perfusion and Arterial Transit Time in Myocardium Using Free-Breathing Myocardial Arterial Spin Labeling With Navigator-Echo*, Magn. Reson. Med. 64(5), 1289–1295.
78. Yushkevich, P. A.; **Avants**, B. B.; Das, S. R.; Pluta, J.; Altinay, M.; Craige, C. & Init, A. D. N. (2010), *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(2), 434–445.
79. Yushkevich, P. A.; Wang, H.; Pluta, J.; Das, S. R.; Craige, C.; **Avants**, B. B.; Weiner, M. W. & Mueller, S. (2010), *Nearly automatic segmentation of hippocampal subfields in in vivo focal T2-weighted MRI*, Neuroimage 53(4), 1208–1224.

80. Ash, S.; Moore, P.; Vesely, L.; Gunawardena, D.; McMillan, C.; Anderson, C.; **Avants**, B. & Grossman, M. (2009), *Non-fluent speech in frontotemporal lobar degeneration*, Journal of Neurolinguistics 22(4), 370–383.
81. **Avants**, B.; Khan, A.; McCluskey, L.; Elman, L. & Grossman, M. (2009), *Longitudinal Cortical Atrophy in Amyotrophic Lateral Sclerosis With Frontotemporal Dementia*, Arch. Neurol. 66(1), 138–139.
82. Bonner, M. F.; Vesely, L.; Price, C.; Anderson, C.; Richmond, L.; Farag, C.; **Avants**, B. & Grossman, M. (2009), *Reversal of the concreteness effect in semantic dementia*, Cognitive Neuropsychology 26(6), 568–579.
83. Das, S. R.; **Avants**, B. B.; Grossman, M. & Gee, J. C. (2009), *Registration based cortical thickness measurement*, Neuroimage 45(3), 867–879.
84. Das, S. R.; Mechanic-Hamilton, D.; Korczykowski, M.; Pluta, J.; Glynn, S.; **Avants**, B. B.; Detre, J. A. & Yushkevich, P. A. (2009), *Structure Specific Analysis of the Hippocampus in Temporal Lobe Epilepsy*, Hippocampus 19(6), 517–525.
85. Klein, A.; Andersson, J.; Ardekani, B. A.; Ashburner, J.; **Avants**, B.; Chiang, M.-C.; Christensen, G. E.; Collins, D. L.; Gee, J.; Hellier, P.; Song, J. H.; Jenkinson, M.; Lepage, C.; Rueckert, D.; Thompson, P.; Vercauteren, T.; Woods, R. P.; Mann, J. J. & Parsey, R. V. (2009), *Evaluation of 14 nonlinear deformation algorithms applied to human brain MRI registration*, Neuroimage 46(3), 786–802.
86. Massimo, L.; Powers, C.; Moore, P.; Vesely, L.; **Avants**, B.; Gee, J.; Libon, D. J. & Grossman, M. (2009), *Neuroanatomy of Apathy and Disinhibition in Frontotemporal Lobar Degeneration*, Dement. Geriatr. Cogn. Disord. 27(1), 96–104.
87. Pluta, J.; **Avants**, B. B.; Glynn, S.; Awate, S.; Gee, J. C. & Detre, J. A. (2009), *Appearance and Incomplete Label Matching for Diffeomorphic Template Based Hippocampus Segmentation*, Hippocampus 19(6), 565–571.
88. Schoenemann, P. T.; Monge, J.; **Avants**, B. B. & Gee, J. C. (2009), *An atlas of modern human cranial morphology constructed via non-rigid deformation analysis of high-resolution CT images*, Am. J. Phys. Anthropol., 231.
89. Tustison, N. J.; **Avants**, B. B. & Gee, J. C. (2009), *Directly Manipulated Free-Form Deformation Image Registration*, IEEE Trans Image Process 18(3), 624–635.
90. Yushkevich, P. A.; **Avants**, B. B.; Pluta, J.; Das, S.; Minkoff, D.; Mechanic-Hamilton, D.; Glynn, S.; Pickup, S.; Liu, W.; Gee, J. C.; Grossman, M. & Detre, J. A. (2009), *A high-resolution computational atlas of the human hippocampus from postmortem magnetic resonance imaging at 9.4 T*, Neuroimage 44(2), 385–398.
91. **Avants**, B.; Duda, J. T.; Kim, J.; Zhang, H.; Pluta, J.; Gee, J. C. & Whyte, J. (2008), *Multivariate Analysis of Structural and Diffusion Imaging in Traumatic Brain Injury*, Acad. Radiol. 15(11), 1360–1375.
92. **Avants**, B. B.; Epstein, C. L.; Grossman, M. & Gee, J. C. (2008), *Symmetric diffeomorphic image registration with cross-correlation: Evaluating automated labeling of elderly and neurodegenerative brain*, Med. Image Anal. 12(1), 26–41.
93. Grossman, M.; Anderson, C.; Khan, A.; **Avants**, B.; Elman, L. & McCluskey, L. (2008), *Impaired action knowledge in amyotrophic lateral sclerosis*, Neurology 71(18), 1396–1401.
94. Grossman, M.; Anderson, C.; Khan, A.; **Avants**, B.; Elman, L. & McCluskey, L. (2008), *Neural basis for impaired action knowledge in amyotrophic lateral sclerosis*, Neurology 70(11, 1), A248.
95. Kim, J.; **Avants**, B.; Patel, S.; Whyte, J.; Coslett, B. H.; Pluta, J.; Detre, J. A. & Gee, J.

- C. (2008), *Structural consequences of diffuse traumatic brain injury: A large deformation tensor-based morphometry study*, Neuroimage 39(3), 1014–1026.
96. Massimo, L. M.; Anderson, C.; Moore, P.; **Avants**, B.; Libon, D.; Cynwyd, B. & Grossman, M. (2008), *Neuroanatomical correlates of apathy and disinhibition in frontotemporal dementia*, Neurology 70(11, 1), A443.
 97. Schoenemann, P. T.; Holloway, R. L.; **Avants**, B. B. & Gee, J. C. (2008), *Endocast asymmetry in pongids assessed via non-rigid deformation analysis of high-resolution CT images*, Am. J. Phys. Anthropol.(46), 188.
 98. Schoenemann, P. T.; Holloway, R. L.; **Avants**, B. B. & Gee, J. C. (2008), *The role of micro-morphological stress markers in the differential diagnosis of infectious bone diseases*, Am. J. Phys. Anthropol.(46), 188–189.
 99. Simon, T. J.; Wu, Z.; **Avants**, B.; Zhang, H.; Gee, J. C. & Stebbins, G. T. (2008), *Atypical cortical connectivity and visuospatial cognitive impairments are related in children with chromosome 22q11.2 deletion syndrome*, Behav Brain Funct 4, 25.
 100. Aguirre, G. K.; Komaromy, A. M.; Cideciyan, A. V.; Brainard, D. H.; Aleman, T. S.; Roman, A. J.; **Avants**, B. B.; Gee, J. C.; Korczykowski, M.; Hauswirth, W. W.; Acland, G. M.; Aguirre, G. D. & Jacobson, S. G. (2007), *Canine and human visual cortex intact and responsive despite early retinal blindness from RPE65 mutation*, PLoS Med. 4(6), 1117–1128.
 101. **Avants**, B. B.; Hurt, H.; Giannetta, J. M.; Epstein, C. L.; Shera, D. M.; Rao, H.; Wang, J. & Gee, J. C. (2007), *Effects of heavy in utero cocaine exposure on adolescent caudate morphology*, Pediatr. Neurol. 37(4), 275–279.
 102. Fan, Y.; Rao, H.; Hurt, H.; Giannetta, J.; Korczykowski, M.; Shera, D.; **Avants**, B. B.; Gee, J. C.; Wang, J. & Shen, D. (2007), *Multivariate examination of brain abnormality using both structural and functional MRI*, Neuroimage 36(4), 1189–1199.
 103. Ng, L.; Pathak, S. D.; Kuan, C.; Lau, C.; Dong, H.; Sodt, A.; Dang, C.; **Avants**, B.; Yushkevich, P.; Gee, J. C.; Haynor, D.; Lein, E.; Jones, A. & Hawrylycz, M. (2007), *Neuroinformatics for genome-wide 3D gene expression mapping in the mouse brain*, IEEE-ACM T. Comput. Bi. 4(3), 382–393.
 104. Rao, H.; Wang, J.; Giannetta, J.; Korczykowski, M.; Shera, D.; **Avants**, B. B.; Gee, J.; Detre, J. A. & Hurt, H. (2007), *Altered resting cerebral blood flow in adolescents with in utero cocaine exposure revealed by perfusion functional MRI*, Pediatrics 120(5), E1245-E1254.
 105. Schoenemann, P. T.; Gee, J.; **Avants**, B.; Holloway, R. L.; Monge, J. & Lewis, J. (2007), *Validation of plaster endocast morphology through 3D CT image analysis*, Am. J. Phys. Anthropol. 132(2), 183–192.
 106. Schoenemann, P. T.; Monge, J.; **Avants**, B. B.; Glotzer, D. & Gee, J. C. (2007), *Sex differences in cranial form assessed via non-rigid deformation analysis of high-resolution CT images*, Am. J. Phys. Anthropol.(44), 209.
 107. Zhang, H.; **Avants**, B. B.; Yushkevich, P. A.; Woo, J. H.; Wang, S.; McCluskey, L. F.; Elman, L. B.; Melhem, E. R. & Gee, J. C. (2007), *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(11), 1585–1597.
 108. **Avants**, B. B.; Schoenemann, P. T. & Gee, J. C. (2006), *Lagrangian frame diffeomorphic image registration: Morphometric comparison of human and chimpanzee cortex*, Med. Image Anal. 10(3), 397–412.
 109. **Avants**, B.; Grossman, M. & Gee, J. C. (2005), *The correlation of cognitive decline with frontotemporal dementia induced annualized gray matter loss using diffeomorphic morphome-*

- try, Alzheimer Dis. Assoc. Disord. 19 Suppl 1, S25–S28.
110. **Avants**, B.; Gee, J.; Schoenemann, P.; Monge, J.; Lewis, J. & Holloway, R. (2005), *A new method for assessing endocast morphology: calculating local curvature from 3D CT images*, Am. J. Phys. Anthropol.(40), 67.
 111. Sundaram, T. A.; **Avants**, B. B. & Gee, J. C. (2005), *Towards a dynamic model of pulmonary parenchymal deformation: evaluation of methods for temporal reparameterization of lung data*, Med Image Comput Comput Assist Interv 8(Pt 2), 328–335.
 112. **Avants**, B. & Gee, J. (2004), *Geodesic estimation for large deformation anatomical shape averaging and interpolation*, Neuroimage 23(1), S139–S150.
 113. **Avants**, B.; Gee, J.; Schoenemann, P. T.; Monge, J.; Lewis, J. E. & Holloway, R. L. (2004), *Validation of plaster endocast morphology through 3D CT image analysis*, Am. J. Phys. Anthropol.(38), 56.
 114. Schoenemann, P. T.; **Avants**, B. B.; Gee, J. C.; Glotzer, L. D. & Sheehan, M. J. (2004), *Analysis of chimp-human brain differences via non-rigid deformation of 3D MR images*, Am. J. Phys. Anthropol.(38), 174–175.
 115. **Avants**, B. & Gee, J. (2003), *The shape operator for differential analysis of images*, Inf Process Med Imaging 18, 101–113.
 116. Dubb, A.; Gur, R.; **Avants**, B. & Gee, J. (2003), *Characterization of sexual dimorphism in the human corpus callosum*, Neuroimage 20(1), 512–519.
 117. **Avants**, B.; Soodak, D. & Ruppeiner, G. (1999), *Measuring the electrical conductivity of the earth*, American Journal of Physics 67(7), 593–598.

Selected Conference Publications

1. Hutchison, R. M.; Chiao, P. & **Avants**, B. B.; 'Decomposing the interdependence of brain anatomy, connectivity, and perfusion' (2017), Annual Meeting of the Organization for Human Brain Mapping, Vancouver, Canada, June 25 - 29.
2. Pustina, D; Coslett, B.; Schwartz, M. F.; & **Avants**, B. B.; 'A supervised framework for lesion segmentation and automated VLSM analyses in left hemispheric stroke' (2015), Academy of Aphasia 53rd Annual Meeting, Tucson, USA, 18 Oct - 20 Oct.
3. Kandel, B. M.; Wang, D. J. J.; Gee, J. C. & **Avants**, B. B. (2014), *Single-subject structural networks with closed-form rotation invariant matching improve power in developmental studies of the cortex*, Med Image Comput Comput Assist Interv 17(Pt 3), 137–144.
4. Xie, L.; Pluta, J.; Wang, H.; Das, S. R.; Mancuso, L.; Kliot, D.; **Avants**, B. B.; Ding, S.-L.; Wolk, D. A. & Yushkevich, P. A. (2014), *Automatic clustering and thickness measurement of anatomical variants of the human perirhinal cortex*, Med Image Comput Comput Assist Interv 17(Pt 3), 81–88.
5. 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)
6. P. Dhillon, B. M. Kandel, D. Wolk, J. C. Gee & B. **Avants**, "Prior-based Eigenanatomy for Classification of Autism Spectrum Disorder", *PRNI*, (2013)
7. 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)
8. 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)

9. 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)
10. 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)
11. 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)
12. 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)
13. 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)
14. 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)
15. 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)
16. B. B. **Avants**, C. L. Epstein & J. C. Gee, "Geodesic image normalization and temporal parameterization in the space of diffeomorphisms", , 4091, 9-16 (2006)
17. Z. Song, N. Tustison, B. **Avants** & J. C. Gee, "Integrated graph cuts for brain MRI segmentation", , 4191, 831-838 (2006)
18. 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)
19. 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)
20. 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)
21. B. **Avants**, C. Epstein & J. Gee, "Geodesic image interpolation: Parameterizing and interpolating spatiotemporal images", , 3752, 247-258 (2005)
22. 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)
23. 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)
24. 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)
25. B. **Avants** & J. Gee, "Symmetric geodesic shape averaging and shape interpolation", , 3117,

- 99-110 (2004)
26. 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)
 27. B. **Avants** & J. Gee, "Formulation and evaluation of variational curve matching with prior constraints", , 2717, 21-30 (2003)
 28. B. **Avants** & J. Gee, "The shape operator for differential analysis of images", , 2732, 101-113 (2003)
 29. B. **Avants** & J. Gee, "Continuous curve matching with scale-space curvature and extrema-based scale selection", , 2695, 798-813 (2003)
 30. 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.: Relating high-dimensional structural networks to resting functional connectivity with sparse canonical correlation analysis for neuroimaging. Springer Protocols on Brain Morphometry (2017, in press).
2. Cullen, N. & **Avants**, B.: Deep learning for brain segmentation. Springer Protocols on Brain Morphometry (2017, in press).
3. **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.
4. 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.
5. 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.