# CURRICULUM VITAE

Nicholas J. Tustison

1. **Education**

2004 D.Sc. Biomedical Eng. Washington University in St. Louis

2000 M.S. Biomedical Eng. University of Virginia

1998 B.S. Applied Physics: CS Brigham Young University

1. **Post-Graduate Education**

2005 Post-doctoral fellowship University of Pennsylvania

1. **Academic Appointments**

July 2010- Assistant Professor University of Virginia

January 2016- Visiting Assistant Researcher University of California, Irvine

Pending Adjunct Professor University of Pennsylvania

1. **Other Employment Pertaining to Current Professional Appointments**

Nov 2006—June 2010 Staff Scientist University of Pennsylvania

1. **Honors and Awards**

* 1st place, EMPIRE10 lung registration competition, MICCAI Conference 2010 (Team: Gang Song, Nick Tustison, Brian Avants, Jim Gee).
* 1st place, BRATS2013 multimodal brain tumor segmentation competition, MICCAI Conference 2013 (Team: Nick Tustison, Max Wintermark, Chris Durst, Brian Avants).
* Best paper award, STACOM2014 cardiac motion estimation challenge, MICCAI Conference 2014 (Team: Nick Tustison, Yang Yang, Michael Salerno).

1. **Areas of Research Interest**

* Algorithm development for medical image analysis (image registration and segmentation)
* Translational research
* Open science

1. **Current Projects (listed by collaborator)**

* James Stone
  + Computational assessment of neuroimaging correlates of TBI
  + Machine learning-based estimation of white matter hyperintensities
* Tally Altes/John Mugler/Kun Qing/Eduarde E. de Lange
  + Quantitative assessment of hyperpolarized gas imaging in the lungs
* Kun Qing/John Mugler/Mike Shim
  + CT image analysis algorithms
* Jonathon Kipnis/Anthony Filiano
  + Resting state fMRI in knockout mice
* Mike Yassa (UC Irvine)
  + Cortical thickness in the Alzheimers Disease Neuromaging Initiative (ADNI) cohort
* James Gee (UPenn)
  + Longitudinal neuroimaging quantitative analysis
  + Lung-ITK: publicly available tools for lung imaging analysis
  + Advanced Normalization Tools
  + General algorithmic development

1. **Other Professional Activities (Boards, Editorships, etc.)**

SPIE Medical Imaging Conference Program Committee 2012—

Frontiers in Neuroinformatics Review Editorial Board May 2012—

Frontiers Topic Editor: Neuroinformatics with the Insight Toolkit

**Papers Published or in Press**

### **Peer Reviewed**

Allen GI, Amoroso N, Anghel C, Balagurusamy V, Bare CJ, Beaton D, Bellotti R, Bennett DA, Boehme K, Boutros PC, Caberlotto L, Caloian C, Campbell F, Neto EC, Chang Y-C, Chen B, Chen C-Y, Chien T-Y, Clark T, Das S, Davatzikos C, Deng J, Dillenberger D, Dobson RJB, Dong Q, Doshi J, Duma D, Errico R, Erus G, Everett E, Fardo DW, Friend SH, Fröhlich H, Gan J, St George-Hyslop P, Ghosh SS, Glaab E, Green RC, Guan Y, Hong M-Y, Huang C, Hwang J, Ibrahim J, Inglese P, Jiang Q, Katsumata Y, Kauwe JSK\*, Klein A\*, Kong D, Krause R, Lalonde E, Lauria M, Lee E, Lin X, Liu Z, Livingstone J, Logsdon BA, Lovestone S, Lyappan A, Ma M, Malhotra A, Mangravite LM\*, Maxwell TJ, Merrill E, Nagorski J, Namasivayam A, Narayan M, Naz M, Newhouse SJ, Norman TC, Nurtdinov RN, Oyang Y-J, Pawitan Y, Peng S, Peters MA\*, Piccolo SR, Praveen P, Priami C, Sabelnykova VY, Senger P, Shen X, Simmons A, Sotiras A, Stolovitzky G, Tangaro S, Tateo A, Tung Y-A, **Tustison NJ**, Varol E, Vradenburg G, Weiner MW, Xiao G, Xie L, Xie Y, Xu J, Yang H, Zhan X, Zhou Y, Zhu F, Zhu H, Zhu S, Alzheimer's Disease Neuroimaging Initiative. Crowdsourced estimation of cognitive decline and resilience in Alzheimer's disease. *Alzheimers Dement*, In press. Cited 0 times; IF = 12.407; Rank 3 out of 192 clinical neurology.

The ANTs software library, written by Dr. Tustison, was used to provide cortical thickness measures.

Pustina DP\*, Coslett BH, Turkeltaub PE, **Tustison N**, Schwartz MF, and Avants B. Automated segmentation of chronic stroke lesions using LINDA: Lesion Identification with Neighborhood Data Analysis, *Hum Brain Mapp*, In press. Cited 0 times; IF = 5.969; Rank 2 out of 14 neuroimaging, 27 out of 252 neurosciences, 5 out of 125 radiology, nuclear medicine & medical imaging.

The core machine learning framework was written by Dr. Tustison and enhanced for lesion application.

Hasan KM\*, Mwangi B, Cao B, Keser Z, **Tustison NJ**, Kochunov P, Frye RE, Savatic M, Soares J. Entorhinal cortex thickness across the human lifespan. *J of Neuroimaging*, In press. Cited 0 times; IF = 1.734; Rank 128 out of 192 clinical neurology, 12 out of 14 neuroimaging, and 65 out of 125 radiology, nuclear medicine & medical imaging.

The entorhinal cortical thickness measures for the well-known ADNI data set were provided by Dr. Tustison.

Altes TA, Mugler JP, III, Ruppert K, **Tustison NJ**, Gersbach J, Szentpetery S, Meyer CH, de Lange EE, and Teague WG\*. Clinical Correlates of Lung Ventilation in Asthmatic Children. *J Allergy Clin Immun*, In press. Cited 0 times; IF = 11.476; Rank 1 out of 24 allergy, 6 out of 148 immunology.

Dr. Tustison provided the image analysis techniques for quantifying ventilation.

**Tustison NJ\***, Qing K, Wang C, Altes TA, Mugler JP, III. Atlas-based estimation of lung and lobar anatomy in proton MRI. *Magn Reson Med*, In press. Cited 0 times; IF = 3.571; Rank 20 out of 125 radiology, nuclear medicine & medical imaging.

Qing K, Altes TA, **Tustison NJ**, Feng X, Chen X, Mata JF, Miller GW, de Lange EE, Tobias WA, Cates GD, Jr., Brookeman JR, Mugler JP, III\*. Rapid Acquisition of Helium-3 and Proton 3D Image Sets of the Human Lung in a Single Breath-hold using Compressed Sensing. *Magn Reson Med*, 74(4):1110-5, October 2015. Cited 1 time; IF = 3.571; Rank 20 out of 125 radiology, nuclear medicine & medical imaging.

Dr. Tustison provided the image analysis techniques for quantifying ventilation.

Menze BH\*, Jakab A, Bauer S, Kalpathy-Cramer J, Farahani K, Kirby J, Burren Y, Porz N, Slotboom J, Wiest R, Lanczi L, Gerstner E, Weber M-A, Arbel T, Avants BB, Ayache N, Buendia P, Collins DL, Cordier N, Corso JJ, Criminisi A, Das T, Delingete H, Demiralp C, Durst CR, Dojat M, Doyle S, Festa J, Forbes F, Geremia E, Glocker B, Golland P, Guo X, Hamamci A, Iftekharuddin KM, Jena R, John NM, Konukoglu E, Lashkari D, Mariz JA, Meier R, Pereira S, Precup D, Price SJ, Riklin-Raviv T, Reza SMS, Ryan M, Schwartz L, Shin H-C, Shotton J, Silva CA, Sousa N, Subbanna NK, Szekely G, Taylor TJ, Thomas OM, **Tustison NJ**, Unal G, Vasseur F, Wintermark M, Ye DH, Zhao L, Zhao B, Zikic D, Prastawa M, Reyes M, and Leemput KV. The Multimodal Brain Tumor Image Segmentation Benchmark (BRATS). *IEEE Trans Med Imaging*, 34(10):1993-2024, October 2015. Cited 96 times; IF = 3.390; Rank 5 out of 100 computer science, interdisciplinary applications, 12 out of 76 biomedical engineering, 18 out of 249 electrical & electronic engineering, 3 out of 24 imaging science & photographic technology, 21 out of 125 radiology, nuclear medicine & medical imaging.

This manuscript details automated brain tumor segmentation competitions for the years 2012 and 2013. Dr. Tustison competed in and won the competition in 2013.

Durst CR\*, Michael N, **Tustison NJ**, Patrie JT, Raghavan P, Wintermark M, Velan SS. Noninvasive Evaluation of the Regional Variations of GABA using Magnetic Resonance Spectroscopy at 3 Tesla. *Magn Reson Imaging*, 33(5):611-7, June 2015. Cited 1 time; IF = 2.090; Rank 49 out of 125 radiology, nuclear medicine & medical imaging.

The ANTs software library, written by Dr. Tustison, was used to provide the quantitative image measures.

**Tustison NJ\***, Shrinhidi KL, Wintermark M, Durst CR, Kandel BM, Gee JC, Grossman MC, and Avants BB. Optimal symmetric multimodal templates and concatenated random forests for supervised brain tumor segmentation (simplified) with ANTsR. *Neuroinformatics*, 13(2):209-225, April 2015. Cited 10 times; IF = 2.825; Rank 13 out of 102 computer science, interdisciplinary applications, 124 out of 252 neurosciences.

Avants BB\*, Johnson HJ, **Tustison NJ**. Neuroinformatics and The Insight ToolKit. *Front Neuroinform,* 9:5, March 2015. Cited 1 time; IF = 3.261; Rank 8 out of 57 mathematical and computational biology, 105 out of 252 neurosciences.

This is an opinion piece introducing a special issue all the co-authors co-edited.

Avants B\*, Duda J, Kilroy E, Jann K, Kandel B, Yan L, Jog M, **Tustison N**, Smith R, Wang Y, Krasileva K, Rapretto M, and Wang D. The Pediatric Template of Brain Perfusion, *Scientific Data*, February 2015. Cited 3 times (new journal).

The ANTs software library, written by Drs. Avants and Tustison, was used to provide the quantitative image measures.

Xin Y, Song G, Cereda M, Kadlecek S, Hamedani H, Jiang Y, Rajaei J, Clapp J, Profka H, Meeder N, Wu J, **Tustison N**, Gee J, and Rizi R\*. Semi-Automatic Segmentation of Longitudinal Computed Tomography Images in a Rat Model of Lung Injury by Surfactant Depletion. *J Appl Physiol,* 118(3):377-85, February 2015. Cited 2 times; IF = 3.056; Rank 26 out of 83 physiology, 8 out of 81 sport sciences.

The ANTs software library, written by Dr. Tustison, was used to provide the quantitative image measures.

Yoder JH, Peloquin JM, Song G, **Tustison NJ**, Moon SM, Wright AC, Vresilovic EJ, Gee JC, and Elliott DM\*. Internal Human Intervertebral Disc 3D Strains Under Axial Compression Quantified Non-invasively with MRI and Image Registration. *J Biomech Eng-T ASME*, 136(11), Nov 2014. Cited 7 times; IF = 1.780; Rank 51 out of 73 biophysics, 37 out of 76 biomedical engineering.

The ANTs software library, written by Dr. Tustison, was used to provide the quantitative image measures.

**Tustison NJ\***, Cook PA, Klein A, Song G, Das SR, Duda JT, Kandel BM, van Strien N, Stone JR, Gee JC, and Avants BB. Large-Scale Evaluation of ANTs and FreeSurfer Cortical Thickness Measurements. *NeuroImage*, 99:166-179, Oct 2014. Cited 28 times; IF = 6.357; Rank 1 out of 14 neuroimaging, 24 out of 252 neurosciences, 3 out of 125 radiology, nuclear medicine & medical imaging.

Said N, Elias WE, Raghavan P, Cupino A, **Tustison N**, Frysinger R, Patrie J, Xin W, and Wintermark M\*. Correlation of Diffusion Tensor Tractography and Intraoperative Macro-Stimulation during Deep Brain Stimulation for Parkinson's Disease. *J Neurosurg,* 25:1-7, July 2014. Cited 3 times; IF = 3.737; Rank 39 out of 192 clinical neurology, 20 out of 198 surgery.

The ANTs software library, written by Dr. Tustison, was used to provide the quantitative image measures.

Wintermark M\*, **Tustison NJ**, Patrie JT, Xin W, Demartini N, Eames M, Sumer S, Lau B, Cupino A, Snell J, Hananel A, Kassell N, and Aubry JF. T1-weighted MRI as a substitute to CT for refocusing planning in MR-guided focused ultrasound. *Phys Med Biol*, 59(13):3599-614, July 2014. Cited 2 times; IF = 2.761; Rank 21 out of 76 biomedical engineering, 34 out of 125 radiology, nuclear medicine and medical imaging.

The ANTs software library, written by Dr. Tustison, was used to provide the quantitative image measures.

Wintermark M\*, Huss DS, Shah BB, **Tustison N**, Druzgal TJ, Kassell N, and Elias J. Thalamic Connectivity in Patients with Essential Tremor Treated with MR Imaging-guided Focused Ultrasound: In Vivo Fiber Tracking by Using Diffusion-Tensor MR Imaging. *Radiology*, 272(1):202-9, July 2014. Cited 5 times; IF = 6.867; Rank 2 out of 125 radiology, nuclear medicine and medical imaging.

The ANTs software library, written by Dr. Tustison, was used to provide the quantitative image measures.

**Tustison NJ\***, Avants BB, Cook PA, Kim J, Whyte J, Gee JC, and Stone JR. Logical Circularity in voxel-based analysis: normalization strategy may induce statistical bias. *Hum Brain Mapp*, 35:745-759, March 2014. Cited 18 times; IF = 5.969; Rank 2 out of 14 neuroimaging, 27 out of 252 neurosciences, 5 out of 125 radiology, nuclear medicine & medical imaging.

Durst CR, Raghavan P, Shaffrey ME, Schiff D, Lopes MB, Sheehan JP, **Tustison NJ**, Patrie JT, Xin W, Elias WJ, Liu KC, Helm GA, Cupino A, and Wintermark M. Multimodal MR imaging model to predict tumor infiltration in patients with gliomas. *Neuroradiology*, 56(2):107-115, February 2014. Cited 7 times; IF = 2.485; Rank 80 out of 192 clinical neurology, 7 out of 14 neuroimaging, 41 out of 125 radiology, nuclear medicine and medical imaging.

The ANTs software library, written by Dr. Tustison, was used to provide the quantitative image measures.

**Tustison NJ\*** and Avants BB. Explicit B-spline regularization in diffeomorphic image registration. *Front Neuroinform*, 7:39, 2013. Cited 18 times; IF = 3.261; Rank 8 out of 57 mathematical & computational biology, 105 out of 252 neurosciences.

**Tustison NJ\*,** Johnson HJ, Rohlfing T, Klein A, Ghosh SS, Ibanez L, and Avants BB. Instrumentation bias in the use and evaluation of scientific software: recommendations for reproducible practices in the computational sciences. *Front Neurosci,* 7:162, 2013. Cited 11 times; IF = 3.656; Rank 82 out of 252 neurosciences.

Song G\*, Barbosa JR EM, **Tustison NJ**, Gefter WB, Kreider M, Gee JC, and Torigian DA. A Comparative Study of HRCT Image Metrics and PFT Values for Characterization of ILD and COPD. *Acad Radiol*, 19(7):857–64, July 2012. Cited 5 times; IF = 1.751; Rank 63 out of 125 radiology, nuclear medicine and medical imaging.

The ANTs software library, written by Dr. Tustison, was used to provide the quantitative image measures.

Yilmaz C, **Tustison NJ**, Dane DM, Ravikumar P, Takahashi M, Gee JC, and Hsia CCW. Functional computed tomography: Progressive adaptation in regional mechanics following extensive lung resection, *J Appl Physiol*, 111(4):1150–8, October 2011. Cited 8 times; IF = 3.056; Rank 26 out of 83 physiology, 8 out of 81 sport sciences.

The ANTs software library, written by Dr. Tustison, was used to provide the quantitative image measures.

Avants BB\*†, **Tustison NJ**†, Wu J, Cook PA, and Gee JC. An Open Source Framework for n-Tissue Segmentation with Evaluation on Public Data, *Neuroinformatics*, 9(4):381– 400, December 2011. †Joint first authorship. Cited 80 times; IF = 2.825; Rank 13 out of 102 computer science, interdisciplinary applications, 124 out of 252 neurosciences.

Murphy K\*, van Ginneken B, Reinhardt JM, Kabus S, Ding K, Deng X, Cao K, Du K, Christensen GE, 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 MP, Schnabel JA, Jenkinson M, Lorenz C, Modat M, McClelland JR, Ourselin S, Muenzing SEA, Viergever MA, De Nigris D, Collins DL, Arbel T, Peroni M, Li R, Sharp GE, Schmidt-Richberg A, Ehrhardt J, Werner R, Smeets D, Loeckx D, Song G, **Tustison N**, Avants B, Gee JC, Staring M, Klein S, Stoel BC, Urschler M, Werlberger M, Vandemeulebroucke J, Rit S, Sarrut D, and Pluim JPW. Evaluation of Registration Methods on Thoracic CT: The EMPIRE10 Challenge, *IEEE Trans Med Imaging*, 30(11):1901–20, November 2011. Cited 177 times; IF = 3.390; Rank 5 out of 100 computer science, interdisciplinary applications, 12 out of 76 biomedical engineering, 18 out of 249 electrical & electronic engineering, 3 out of 24 imaging science & photographic technology, 21 out of 125 radiology, nuclear medicine & medical imaging.

This manuscript details a lung registration challenge occurring in 2010. Dr. Tustison’s team competed in and won the competition.

**Tustison NJ\***, Avants BB, Altes TA, de Lange EE, Mugler III JP, and Gee JC. Ventilation-Based Segmentation of the Lungs Using Hyperpolarized 3He MRI, *J Magn Reson Imaging*, 34(4):831–841, October 2011. Cited 21 times; IF = 3.210; Rank 23 out of 125 radiology, nuclear medicine and medical imaging.

Barbosa Jr EM\*, Song G, **Tustison N**, Kreider M, Gee JC, Gefter W, and Torigian DA. Computational Analysis of Thoracic Multidetector Row HRCT for Segmentation and Quantification of Small Airway Air Trapping and Emphysema in Obstructive Pulmonary Disease, *Acad Radiol*, 18(10):1258-1269, October 2011. Cited 20 times; IF = 1.751; Rank 63 out of 125 radiology, nuclear medicine and medical imaging.

The ANTs software library, written by Dr. Tustison, was used to provide the quantitative image measures.

**Tustison NJ\***, Avants BB, Siqueira M, and Gee JC. Topological Well-Composedness and Glamorous Glue: A Digital Gluing Algorithm for Topologically Constrained Level Set Segmentation, *IEEE T Image Process*, 20(6):1756-1771, June 2011. Cited 4 times; IF = 3.625; Rank 12 out of 123 computer science, artificial intelligence, 14 out of 249 electrical and electronic engineering.

**Tustison NJ\***, Cook TS, Song G, and Gee JC. Pulmonary Kinematics from Image Data—A Review, *Acad Radiol*, 18(4):402–417, April 2011. Cited 15 times; IF = 1.751; Rank 63 out of 125 radiology, nuclear medicine and medical imaging.

**Tustison NJ\***, Awate SP, Song G, Cook TS, and Gee JC. Point Set Registration Using Havrda-Charvat-Tsallis Entropy Measures. *IEEE Trans Med Imaging*, 30(2):451–460, February 2011. Cited 15 times; IF = 3.390; Rank 5 out of 100 computer science, interdisciplinary applications, 12 out of 76 biomedical engineering, 18 out of 249 electrical & electronic engineering, 3 out of 24 imaging science & photographic technology, 21 out of 125 radiology, nuclear medicine & medical imaging.

Avants BB\*, **Tustison NJ**, Song G, Cook PA, Klein A, and Gee JC. A Reproducible Evaluation of ANTs Similarity Metric Performance in Brain Image Registration, *NeuroImage*, 54(3):2033–2044, February 2011. Cited 370 times; IF = 6.357; Rank 1 out of 14 neuroimaging, 24 out of 252 neurosciences, 3 out of 125 radiology, nuclear medicine & medical imaging.

Drs. Avants and Tustison jointly performed the evaluation.

**Tustison NJ\***, Avants BB, Cook PA, Egan A, Zheng Y, Yushkevich PA, and Gee JC. N4ITK: Improved N3 Bias Correction, *IEEE Trans Med Imaging*, 29(6):1310–1320, June 2010. Cited 305 times; IF = 3.390; Rank 5 out of 100 computer science, interdisciplinary applications, 12 out of 76 biomedical engineering, 18 out of 249 electrical & electronic engineering, 3 out of 24 imaging science & photographic technology, 21 out of 125 radiology, nuclear medicine & medical imaging.

**Tustison NJ\***, Altes TA, Song G, de Lange EE, Mugler III JP, and Gee JC. Feature Analysis of Hyperpolarized Helium-3 Pulmonary MRI: A Study of Asthmatics versus Non-Asthmatics, *Magn Reson Med*, 63(6):1448–1455, June 2010. Cited 32 times; IF = 3.571; Rank 20 out of 125 radiology, nuclear medicine & medical imaging.

**Tustison NJ\***, Awate SP, Cai J, Altes TA, Miller GW, de Lange EE, Mugler III JP, and Gee JC. Pulmonary Kinematics from Tagged Hyperpolarized Helium-3 MRI, *J Magn Reson Imaging*, 31(5):1236–1241, May 2010. Cited 13 times; IF = 3.210; Rank 23 out of 125 radiology, nuclear medicine and medical imaging.

**Tustison NJ\***, Avants BB, and Gee JC. Directly manipulated free-form deformation image registration. *IEEE T Image Process,* 18(3):624–35, March 2009. Cited 50 times; IF = 3.625; Rank 12 out of 123 computer science, artificial intelligence, 14 out of 249 electrical and electronic engineering.

Siqueira M\*, Latecki LJ, **Tustison N**, Gallier J, and Gee J. Topological Repairing of 3D Digital Images. *J Math Imaging Vis,* 30(3):249–274, March 2008. Cited 21 times; IF = 1.552; Rank 54 out of 123 computer science, artificial intelligence, 23 out of 104 computer science, software engineering, 34 out of 257 applied mathematics.

Dr. Tustison implemented the topological repairing algorithm and ran the evaluation.

**Tustison NJ** and Amini AA\*. Biventricular myocardial strains via nonrigid registration of anatomical NURBS model. *IEEE Trans Med Imaging* 25(1):94–112, January 2006. Cited 38 times; IF = 3.390; Rank 5 out of 100 computer science, interdisciplinary applications, 12 out of 76 biomedical engineering, 18 out of 249 electrical & electronic engineering, 3 out of 24 imaging science & photographic technology, 21 out of 125 radiology, nuclear medicine & medical imaging.

**Tustison NJ** and Amini AA\*. Myocardial kinematics from tagged MRI based on a 4-D B- spline model. *IEEE T Bio-med Eng,* 50(8):1038–1040, August 2003. Cited 31 times; IF = 2.348; Rank 28 out of 76 biomedical engineering.

Hagspiel KD\*, Altes TA, Mugler III JP, Mata JF, **Tustison NJ**, and Brookeman JR. MR virtual colonography using hyperpolarized 3He as an endoluminal contrast agent: demonstration of feasibility. *Magn Reson Med,* 44(5):813, November 2000. Cited 16 times; IF = 3.571; Rank 20 out of 125 radiology, nuclear medicine & medical imaging.

Dr. Tustison ran the software to perform the evaluation.

1. **Books and/or Chapters**

**Tustison NJ**, Amini AA: Analysis of 4-D Cardiac MR Data with NURBS Deformable Models: Temporal Fitting Strategy and Nonrigid Registration. Parametric and Geometric Deformable Models: An Application in Biomaterials and Medical Imagery. Jasjit S. Suri and Aly Farag (eds.). Springer Publishers, II, May 2007.

1. **Short Communications**

**Tustison NJ**, Avants BB: The TVDMFFDVR Algorithm, Insight Journal 2012, http: //hdl.handle.net/10380/3334.

**Tustison NJ**, Cook PA, Avants BB, Stone JR: Simulated Diffusion-Weighted Imaging for the ITK Masses, Insight Journal 2011, <http://hdl.handle.net/10380/3315>.

**Tustison NJ**, Avants BB, Siqueira M, Gee JC: Escher’s Ants as Metaphor: Topological Marching for the Well-Composed, Genus Zero Crowd, Insight Journal 2010, http://hdl .handle.net/10380/3234.

**Tustison NJ**, Gee JC: Introducing Dice, Jaccard, and Other Label Overlap Measures To ITK, Insight Journal 2009, <http://hdl.handle.net/10380/3141>.

**Tustison NJ**, Gee JC: Introducing Dice, Jaccard, and Other Label Overlap Measures To ITK, Insight Journal 2009, <http://hdl.handle.net/10380/3141>.

Yushkevich PA, **Tustison NJ**, Gee JC: Gaussian Interpolation, Insight Journal 2009, <http://hdl.handle.net/10380/3139>.

Avants BB, **Tustison NJ**, Song G: Advanced Normalization Tools v1.0, Insight Journal 2009, <http://hdl.handle.net/10380/3113>.

**Tustison NJ**, Gee JC: N4ITK: Nick’s N3 ITK Implementation for MRI Bias Field Correction, Insight Journal 2009, http://hdl.handle.net/10380/3053, Publication of the Month December 2009.

**Tustison NJ**, Gee JC: Stochastic Fractal Dimension Image, Insight Journal 2009,

http://hdl.handle.net/1926/1525 (accepted into the Insight Toolkit), Publication of the Month April 2009.

**Tustison NJ**, Awate SP, Gee JC: Information-Theoretic Directly Manipulated Free- Form Deformation Labeled Point-Set Registration, Insight Journal 2009, http://hdl.handle.net/1926/1524.

**Tustison NJ**, Yushkevich P, Gee JC: Live-Wire-ing the Insight Toolkit with Intelligent Scissors, Insight Journal 2008, <http://hdl.handle.net/1926/1372>.

**Tustison NJ**, Zhang H, Lehmann G, Yushkevich P, Gee JC: Meeting Andy Warhol Somewhere Over the Rainbow: RGB Colormapping and ITK, Insight Journal 2008, http://hdl.handle.net/1926/1452 (accepted into the Insight Toolkit).

**Tustison NJ**, Gee JC: Image Kernel Convolution, Insight Journal 2008, http://hdl. handle.net/1926/1323 (accepted into the Insight Toolkit).

**Tustison NJ**, Yushkevich P, Song Z, Gee JC: Graph Cuts, Caveat Utilitor, and Euler’s Bridges of Konigsberg, Insight Journal 2008, http://hdl.handle.net/1926/1503, Publication of the Month December 2008.

**Tustison NJ**, Gee JC, Run-Length Matrices For Texture Analysis, Insight Journal 2008, http://hdl.handle.net/1926/1374.

**Tustison NJ**, Awate SP, Gee JC: A Novel Information-Theoretic Point-Set Measure Based on the Jensen-Havrda-Charvat-Tsallis Divergence, Insight Journal 2008, http: //hdl.handle.net/1926/1497.

**Tustison NJ**, Siqueira M, Gee JC: Well-Composedness and the Topological Repairing of 2-D and 3-D Digital Images, Insight Journal 2007, http://hdl.handle.net/1926/470.

**Tustison NJ**, Gee JC: Go-Go Gabor Gadgetry, Insight Journal 2007, http://hdl.handle .net/1926/500 (accepted into the Insight Toolkit).

**Tustison NJ**, Avants BB, Gee JC: Gridding Graphic Graticules, Insight Journal 2007, http://hdl.handle.net/1926/475 (accepted into the Insight Toolkit).

**Tustison NJ**, Siqueira M, Gee JC: N-D linear time exact signed Euclidean distance transform. Insight Journal 2006, http://hdl.handle.net/1926/171 (accepted into the Insight Toolkit).

**Tustison NJ**, Gee JC: N-D Ck B-Spline Scattered Data Approximation, Insight Journal 2005, http://hdl.handle.net/1926/140 (accepted into the Insight Toolkit).

1. **Abstracts and Conference Proceedings**

Durst C, Raghavan P, **Tustison N**, Patrie, J, Cupino A, Xin W, Wintermark M. Mul- tiparametric Imaging Model to Accurately Predict Extent of Invasion of High-Grade Gliomas. ASNR Scientific Paper (Oral), 2013.

**Tustison NJ**, Muratore A, Contrella B, Mugler III JP, de Lange EE, and Altes TA. Voxelwise Comparison of Hyperpolarized He-3 and Xe-129 Lung Ventilation MR Imaging in Cystic Fibrosis. In Proceedings of the 21st Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM), Salt Lake City, 2013.

**Tustison NJ**, Avants BB, Cook PA, Song G, Das S, van Strien N, Stone JR, Gee JC: The ANTs Cortical Thickness Processing Pipeline. In: SPIE Medical Imaging: Biomedical Applications in Molecular, Structural, and Functional Imaging. Orlando 2013.

**Tustison NJ**, Contrella B, Altes TA, Avants BB, de Lange EE, Mugler III JP: Longi- tudinal assessment of treatment effects on pulmonary ventilation using 1H/3He MRI multivariate templates. In: SPIE Medical Imaging: Biomedical Applications in Molec- ular, Structural, and Functional Imaging. Orlando 2013.

**Tustison NJ**, Avants BB, Cook PA, Gee JC, Stone JR: Statistical Bias in Optimized VBM. In: SPIE Medical Imaging: Biomedical Applications in Molecular, Structural, and Functional Imaging. Orlando 2013.

**Tustison NJ**, Avants BB: Diffeomorphic Directly Manipulated Free-Form Deformation Image Registration via Vector Field Flows. In: Proceedings of the Workshop on Biomedical Image Registration. Nashville 2012.

Avants BB, **Tustison NJ**, Song G, Wu B, Stauffer M, McCormick MM, Johnson HJ, Gee JC, Insight Software Consortium: A Unified Image Registration Framework for ITK4. In: Proceedings of the Workshop on Biomedical Image Registration. Nashville 2012.

Contrella B, **Tustison NJ**, Altes TA, Avants BB, Mugler III JP, de Lange EE: 4D seg- mentation and normalization of 3He MR images for intra-subject assessment of venti- lated lung volumes. In: SPIE Medical Imaging: Biomedical Applications in Molecular, Structural, and Functional Imaging. San Diego 2012.

Zheng Y, Keller B, Wang Y, **Tustison N**, Song G, Bakic PR, Maidment AD, Conant EF, Gee JC, Kontos D: A Fully-Automated Software Pipeline for Parenchymal Pattern Analysis in Digital Breast Images: Towards the Translation of Imaging Biomarkers in Routine Breast Cancer Risk Assessment. In: The Quantitative Imaging Reading Room Showcase at RSNA 2011 Annual Meeting and Scientific Assembly, Chicago 2011.

**Tustison NJ**, Avants BB, Cook P, Kim J, Whyte J, Gee JC, Ahlers S, Stone J: Multivari- ate Analysis of Diffusion Tensor Imaging and Cortical Thickness Maps in a Traumatic Brain Injury (TBI) Cohort Using Advanced Normalization Tools (ANTs). In: Proceed- ings of the 2011 annual meeting of the National Neurotrauma Society, Fort Lauderdale, 2011.

Qing K, Altes TA, **Tustison NJ**, Mata JF, Miller GW, de Lange EE, Tobias WA, Cates GD, Brookeman JR, Mugler JP: Acquisition of Spatially-registered Helium-3 and Proton 3D Image Sets of the Lung in less than 10 seconds using Compressed Sensing. In Proceedings of the 19th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM), Montreal, 2011.

**Tustison NJ**, Avants BB, Flors L, Altes TA, de Lange EE, Mugler II JP, Gee JC: Seg- mentation of Lung Ventilation Defects Using Hyperpolarized 3He MRI. In: Proceed- ings of the 2011 International Functional Pulmonary Imaging Workshop, Philadelphia, 2011.

**Tustison NJ**, Avants BB, Flors L, Altes TA, de Lange EE, Mugler II JP, Gee JC: Ventilation-Based Segmentation of the Lungs Using Hyperpolarized Helium-3 MRI. In: Joint Meeting combining The 3rd meeting of the Japanese Society of Pulmonary Functional Imaging and 5th International Workshop for Pulmonary Functional Imag- ing, Hyogo, 2011.

Hsia CCW, Yilmaz C, **Tustison NJ**, Dane DM, Ravikumark P, Takahashi M, Gee JC: Non-invasive measurement of regional mechanical strain and shear following extensive lung resection by high-resolution computed tomography (HRCT). In: Proceedings of the American Thoracic Society International Conference, Denver, 2011.

Song G, **Tustison NJ**, Avants BB, Gee JC: Lung CT Image Registration Using Dif- feomorphic Transformation Models. In: Proceedings of the Evaluation of Methods

for Pulmonary Image Registration (EMPIRE) Grand Challenge organized by the 13th International Conference on Medical Image Computing and Computer Assisted Inter- vention, Beijing, 2010.

**Tustison NJ**, Avants BB, Altes TA, Mugler II JP, Gee JC: Automatic Segmentation of Ventilation Defects in Hyperpolarized 3He MRI. In: Proceedings of the Annual Meeting of the Biomedical Engineering Society, Austin, 2010.

Avants B, Cook PA, McMillan C, Grossman M, **Tustison NJ**, Zheng Y, Gee JC: Sparse Unbiased Analysis of Anatomical Variance in Longitudinal Imaging. In: Proceedings of the Medical Image Computing and Computer Assisted Intervention Society (MICCAI), Beijing, 2010.

Avants B, Klein A, **Tustison N**, Woo J, Gee J: Evaluation of an Open-Access, Auto- mated Brain Extraction Method on Multi-Site Multi-Disorder Data. In: Proceedings of the 16th Annual Meeting of the Organization for Human Brain Mapping (HBM), Barcelona, 2010.

Wright AC, Yoder J, **Tustison N**, Gee J, Wehrli FW, Elliot DM: High-Resolution MRI at 7T of Local Strains in the Intervertebral Disc. In: Proceedings of the 18th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM), Stockholm, 2010.

**Tustison NJ**, Altes TA, Miller GW, de Lange EE, Mugler JP, Gee JC: Retrospective Bias Correction of Hyperpolarized 3He MRI of the Lung. In: Proceedings of the 18th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM), Stockholm, 2010.

**Tustison NJ**, Altes TA, Song G, de Lange EE, Mugler JP, Gee JC: Hyperpolarized 3He Image Feature Analysis in Asthmatics. In: Proceedings of the 18th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM), Stockholm, 2010.

**Tustison NJ**, Avants BB, Cook P, Gee J: N4ITK: Improved N3 Bias Correction with Robust B-Spline Approximation. In: Proceedings of the 7th Annual IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI), Rotterdam, 2010.

Tustison NJ, Altes TA, Song G, Mugler JP, de Lange EE, Gee JC: Feature Analysis of Hyperpolarized Helium-3 Pulmonary MRI in Asthmatics versus Non-Asthmatics. In: Proceedings of the 2nd International Workshop on Pulmonary Image Analysis, London, 2009.

Cook TS, **Tustison NJ**, Song G, Awate SP, Torigian DA, Gefter W, Gee JC: Segmentation- Based Quantitation of Pulmonary Alveolar Proteinoisis, Pre- and Post-Lavage, Using High-Resolution Computed Tomography. In: Proceedings of the 2nd International Workshop on Pulmonary Image Analysis, London, 2009.

Song G, **Tustison NJ**, Barbosa Jr E, Gee JC, Gefter W, Kreider M, Torigian DA: A Comparative Study of HRCT Image Metrics and PFT Values for Characterization of ILD and COPD. In: Proceedings of the 2nd International Workshop on Pulmonary Image Analysis, London, 2009.

**Tustison NJ**, Awate SP, Song G, Cook T, Gee JC: A new information-theoretic measure to control the robustness-sensitivity trade-off for DMFFD point-set registration. In: Proceedings of the 21st Biennial International Conference on Information Processing in Medical Imaging (IPMI), Williamsburg, 215–226, 2009.

Cook T, Barbosa E, **Tustison N**, Song G, Torigian D, Koo C, Gefter W, Gee J: Quanti- tation of Pulmonary Alveolar Proteinosis, Pre- and Post-Lavage: A Feasibility Study. In: Proceedings of the 2nd World Congress of Thoracic Imaging and Diagnosis in Chest Disease, Valencia, 2009.

Barbosa E, Song G, **Tustison N**, Torigian D, Kreider M, Koo C, Gefter W, Gee J: Computational Analysis of HRCT for characterization and differentiation of ILD and COPD. In: Proceedings of the 2nd World Congress of Thoracic Imaging and Diagnosis in Chest Disease, Valencia, 2009.

Song G, Barbosa E, **Tustison N**, Torigian D, Kreider M, Koo C, Gefter W, Gee J: Computational Analysis of HRCT Images For Characterization and Differentiation of ILD and COPD. In: Proceedings of the 6th Annual IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI), Boston, 2009.

**Tustison NJ**, Kotzer CJ, Logan GA, Podolin PL, Altes TA, Wright AP, Song G, Zhao H, Haczku A, Barnette MS, Panettieri Jr RA, Gee JC: Detection of elastase induced emphysema in free-breathing mice using micro computed tomography (CT). In: Proceedings of the Annual International Conference of the American Thoracic Society, Toronto, 2008.

**Tustison NJ**, Cai J, Altes TA, Miller GW, de Lange EE, Mugler JP, Gee JC: Pulmonary Kinematics From 3-D Hyperpolarized Helium-3 Tagged Magnetic Resonance Imaging. In: Proceedings of the 16th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM), Toronto, 2008.

**Tustison N**, Awate SP, Cai J, Altes T, Miller G, Lange E, Mugler J, Gee JC: Point-set registration of tagged He-3 images using a structurally-based Jensen-Shannon divergence measure within a deterministic-annealing framework. In: Proceedings of the 5th Annual IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI), pp. 772–775, Paris, 2008.

**Tustison NJ**, Altes TA, Gee JC, Cai J, de Lange EE, Mugler III JP: Pulmonary Kinematics From Hyperpolarized Helium-3 Tagged Magnetic Resonance Imaging. In: Proceedings of the 4th Annual IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI), pp. 368–371, Washington D.C., 2007.

Cook TS, **Tustison N**, Biederer J, Tetzlaff R, Gee J: How do registration parameters affect quantitation of lung kinematics? In: Proceedings of the 10th International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI), 10(Pt 1):817–24, 2007.

**Tustison NJ**, Avants BB, Gee JC: Improved FFD B-Spline Image Registration. Proceedings of the 11th Biennial IEEE International Conference on Computer Vision (ICCV), pp. 1–8, Rio de Janeiro, 2007.

**Tustison NJ**, Gee, JC: Generalized n-D Ck B-spline scattered data approximation with confidence values. Proceedings of the 3rd International Workshop on Medical Imaging and Augmented Reality (MIAR), pp. 76–83, Shanghai, 2006.

**Tustison NJ**, Avants BB, Sundaram TA, Duda JT, Gee JC: A Generalization of Free-Form Deformation Image Registration Within the ITK Finite Element Frame- work. Proceedings of the 3rd International Workshop on Biomedical Image Registration (WBIR), pp. 238–246, Utrecht, 2006.

Song Z, **Tustison NJ**, Avants BB, Gee JC: Adaptive graph cuts with tissue priors for brain MRI segmentation. In: Proceedings of the 3rd Annual IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI), pp. 762–765, Arlington, 2006.

Chen J, **Tustison NJ**, Amini AA: Accurate recovery of 4D left ventricular deformations using volumetric B-splines incorporating phase based displacement estimates. In: Proceedings of SPIE: Medical Imaging 2006: Physiology, Function, and Structure from Medical Images, 6143, San Diego, 2006.

**Tustison NJ**, Amini AA: Comparison of parallel and spiral tagged MR imaging geome- tries in estimation of 3D myocardial strains. In: Proceedings of SPIE: Medical Imaging

2005: Physiology, Function, and Structure from Medical Images, 5746:571–579, San Diego, 2005.

**Tustison NJ**, Amini AA: Lagrangian and Eulerian biventricular strains from anatomical NURBS models using tagged MRI. In: Proceedings of SPIE: Medical Imaging 2006: Physiology, Function, and Structure from Medical Images, 5746:192–204, San Diego, 2005.

**Tustison, NJ**, Abendschein D, Amini AA: Biventricular myocardial kinematics based on tagged MRI from anatomical NURBS models. In: Proceedings of the IEEE Computer Vision and Pattern Recognition (CVPR), 2:514, Quebec City, 2004.

**Tustison NJ**, Amini AA: Myocardial Kinematics Based on Tagged MRI From Geo- metric Deformable Models. Proceedings of SPIE: Medical Imaging 2006: Physiology, Function, and Structure from Medical Images, 5369:22-33, San Diego, 2004.

**Tustison NJ**, Amini AA: Tracking Myocardial Beads from SPAMM-MRI with a 4-D B- Spline Model. In: Proceedings of the 2nd Joint EMBS/BMES Conference, pp. 993–994, Houston, 2002.

**Tustison NJ**, Abendschein D, Davila-Roman VG, Amini AA: Myocardial Strain Imaging with Tagged MRI. In: Proceedings of the 16th International Conference on Pattern Recognition (ICPR), 1:723–726, Quebec City, 2002.

Cooley B, Acton ST, Salerno M, Brookeman JR, **Tustison NJ**, de Lange EE, Altes TA: Automated Scoring of Hyperpolarized Helium-3 MR Lung Ventilation Images: Initial Development and Validation. In: Proceedings of the 11thAnnual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM), Honolulu, 2002.

**Tustison NJ**, Yablonskiy D, Conradi M, Amini AA: Deformable Registration of 3HeMR and X-ray CT images of the lungs. In: Proceedings of the 11thAnnual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM), Honolulu, 2002.

Spellman MJ, Hagspiel KD, Altes TA, Mugler III JP, Mata JF, **Tustison NJ**, Brookeman JR: MR Virtual Colonoscopy using Hyperpolarized 3He as an Endoluminal Contrast Agent. In: Proceedings of the 8thAnnual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM), Philadelphia, 1999.