

# John Muschelli

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## Education

- 2012–2016 **PhD, Biostatistics**,  
Johns Hopkins Bloomberg School of Public Health, Baltimore, MD.  
*Computational Methods for Neuroimaging in R: Stroke Hemorrhage in X-ray Computed Tomography Scanning*  
Advisor: Ciprian Crainiceanu, PhD
- 2008–2010 **ScM, Biostatistics**,  
Johns Hopkins Bloomberg School of Public Health, Baltimore, MD.  
*An Iterative Approach to Hemodynamic Response Function Temporal Derivatives in Statistical Parametric Mapping for Functional Neuroimaging*  
Advisor: Brian Caffo, PhD
- 2004–2008 **BS, Biomathematics and Neuroscience**,  
The University of Scranton, Scranton, PA.  
Advisors: Professor Jakub Jasinski, Professor J. Timothy Cannon

## Relevant Experience

- 2016–  
Present **Assistant Scientist**, *Department of Biostatistics*, Johns Hopkins Bloomberg School of Public Health.
- 2012–2016 **Trainee**, *T32AG021334: Epidemiology and Biostatistics of Aging Training Grant*,  
Mentors: Dr. Michelle Carlson, Dr. Ravi Varadhan.
- 2009–2016 **Research Associate**, *Johns Hopkins Biostatistics Consulting Center*, Baltimore, MD.  
Collaborated on statistical projects with senior consultants.  
Weekly consulting for student research projects.  
Report writing and analyzing data using statistical software: R, Stata.
- 2009–2014 **Data Analyst / Data Manager**, *Brain Injury Outcomes Division*, Baltimore, MD.  
Decreased turnaround time on data safety report (from weeks to hours) by using knitr, LaTeX, and dynamic documents.  
Created a standardized database and processing pipeline for CT images.  
Analyzed phase II and III trials for treatment of intracerebral hemorrhage  
Data management and consultation of electronic case report form (eCRF) creation.
- 2010–2012 **Data Analyst**, *Laboratory for Neurocognitive and Imaging Research at Kennedy Krieger Institute*, Baltimore, MD.  
Reduced manual steps in complex imaging study analysis using automation from programming.  
Analysis of functional MRI (fMRI) imaging studies using Statistical Parametric Mapping.  
Programming consultant: Matlab & R.

## Software

### R Packages

All download counts are from RStudio CRAN logs and are accurate as of December 27, 2016.

**fslr: Wrapper Functions for FSL (FMRIB Software Library) from Functional MRI of the Brain (FMRIB),**

*Downloads: 9800.*

**brainR: Helper Functions to Misc3d and rgl Packages for Brain Imaging,**

*Downloads: 9406.*

**WhiteStripe: White Matter Normalization for Magnetic Resonance Images using Whitestripe,**

*Downloads: 5344.*

**matlabr: An Interface for MATLAB using System Calls,**

*Downloads: 3839.*

**diffR: Display Differences Between Two Files using Codediff Library,**

*Downloads: 2617.*

**rscopus: Scopus Database API Interface,**

*Downloads: 2599.*

**spm12r: Wrapper Functions for SPM (Statistical Parametric Mapping) Version 12 from the Wellcome Trust Centre for Neuroimaging,**

*Downloads: 2263.*

**oasis: Multiple Sclerosis Lesion Segmentation using Magnetic Resonance Imaging (MRI),**

*Downloads: 1935.*

**papayar: View Medical Research Images using the Papaya JavaScript Library,**

*Downloads: 1111.*

**neurobase: Neuroconductor Base Package with Helper Functions for nifti Objects,**

*Downloads: 1058.*

**freesurfer: Wrapper Functions for Freesurfer,**

*Downloads: 612.*

GitHub **drammsr: Port of Deformable Registration via Attribute Matching and Mutual-Saliency Weighting (DRAMMS) Registration to R.**

**extrantsr: Additional functionality and extensions to the ANTsR R package.**

**hcp: Human Connectome Project Interface with R.**

**rcamino: R Port of Camino Software.**

**dcm2niir: R wrapper for dcm2nii DICOM converter.**

**ichseg: ICH Segmentation of CT scans.**

**msseg: MS Lesion Segmentation.**

**googleCite: Scraper for Google Citations.**

**processVISION: Scripts for Parsing XML from VISION database.**

## Shiny Web Applications

- 2015 **Abandoned Cars in Baltimore Finder**,  
[https://jmuschelli.shinyapps.io/Abandoned\\_Baltimore\\_Car](https://jmuschelli.shinyapps.io/Abandoned_Baltimore_Car).  
**Unofficial ENAR 2015 Itinerary Maker**,  
[https://muschellij2.shinyapps.io/ENAR\\_2015](https://muschellij2.shinyapps.io/ENAR_2015).
- 2014 **Online DICOM TO NIfTI Converter**,  
<https://muschellij2.shinyapps.io/dcm2nii>.  
**Cost of most common medical procedures at United States hospitals based on Centers for Medicare and Medicaid Services data**,  
[https://jmuschelli.shinyapps.io/Shiny\\_Health\\_Data](https://jmuschelli.shinyapps.io/Shiny_Health_Data).

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## Peer-Reviewed Publications

\* denotes authors contributed equally

- 2017 Maier, O., Menze, B. H., von der Gablentz, J., Häni, L., Heinrich, M. P., Liebrand, M., Winzeck, S., Basit, A., Bentley, P., Chen, L., others, "Isles 2015-a public evaluation benchmark for ischemic stroke lesion segmentation from multispectral mri". *Medical Image Analysis* 35, pp. 250–269.
- 2016 Bundy, D. G., **Muschelli, J.**, Clemens, G. D., Strouse, J. J., Thompson, R. E., Casella, J. F., Miller, M. R. "Preventive care delivery to young children with sickle cell disease". *Journal of pediatric hematology/oncology* 38.4, pp. 294–300.
- Fortin, J.-P., Sweeney, E. M., **Muschelli, J.**, Crainiceanu, C. M., Shinohara, R. T., Initiative, A. D. N., others, "Removing inter-subject technical variability in magnetic resonance imaging studies". *NeuroImage* 132, pp. 198–212.
- Hanley, D. F., Thompson, R. E., **Muschelli, J.**, Rosenblum, M., McBee, N., Lane, K., Bistran-Hall, A. J., Mayo, S. W., Keyl, P., Gandhi, D., others, "Safety and efficacy of minimally invasive surgery plus alteplase in intracerebral haemorrhage evacuation (MISTIE): a randomised, controlled, open-label, phase 2 trial". *The Lancet Neurology* 15.12, pp. 1228–1237.
- Hanley, D. F., Lane, K., McBee, N., Ziai, W., Tuhim, S., Lees, K. R., Dawson, J., Gandhi, D., Ullman, N., Mould, W. A., others, "Thrombolytic removal of intraventricular haemorrhage in treating severe stroke: results of the CLEAR III trial, a randomised, controlled trial". *Lancet*.
- Kickingereder, P., Götz, M., **Muschelli, J.**, Wick, A., Neuberger, U., Shinohara, R., Radbruch, A., Schlemmer, H., Wick, W., Bendszus, M., others, "Large-scale radiomic profiling of glioblastoma identifies an imaging signature for predicting and stratifying antiangiogenic treatment response". *RöFo-Fortschritte auf dem Gebiet der Röntgenstrahlen und der bildgebenden Verfahren*. Vol. 188. S 01, WISS301\_1.
- Sweeney, E. M., Shinohara, R. T., Dewey, B. E., Schindler, M. K., **Muschelli, J.**, Reich, D. S., Crainiceanu, C. M., Eloyan, A. "Relating multi-sequence longitudinal intensity profiles and clinical covariates in incident multiple sclerosis lesions". *NeuroImage: Clinical* 10, pp. 1–17.
- 2015 **Muschelli, J.**, Ullman, N. L., Mould, W. A., Vespa, P., Hanley, D. F., Crainiceanu, C. M. "Validated automatic brain extraction of head CT images". *NeuroImage* 114, pp. 379–385.

- Muschelli, J.**, Sweeney, E., Lindquist, M., Crainiceanu, C. "fslr: connecting the FSL software with R". *R Journal* 7.1, pp. 163–175.
- Muschelli, J.**, Ullman, N. L., Sweeney, E. M., Eloyan, A., Martin, N., Vespa, P., Hanley, D. F., Crainiceanu, C. M. "Quantitative intracerebral hemorrhage localization". *Stroke* 46.11, pp. 3270–3273.
- Choe, A. S., Jones, C. K., Joel, S. E., **Muschelli, J.**, Belegu, V., Caffo, B. S., Lindquist, M. A., van Zijl, P. C., Pekar, J. J. "Reproducibility and temporal structure in weekly resting-state fmri over a period of 3.5 years". *PloS one* 10.10, e0140134.
- Webb, A. J., Ullman, N. L., Morgan, T. C., **Muschelli, J.**, Kornbluth, J., Awad, I. A., Mayo, S., Rosenblum, M., Ziai, W., Aldrich, Zuccarello, F. M., John, S., Harnof, S., Lopez, G., Broaddus, W. C., Wijman, C., Vespa, P., Bullock, R., Haines, S. J., Cruz-Flores, S., Tuhim, S., Hill, M. D., Narayan, R., Hanley, D. F. "Accuracy of the ABC/2 score for intracerebral hemorrhage systematic review and analysis of MISTIE, CLEAR-IVH, and CLEAR III". *Stroke* 46.9, pp. 2470–2476.
- 2014 **Muschelli, J.**, Sweeney, E., Crainiceanu, C. "brainR: interactive 3 and 4D images of high resolution neuroimage data". *R Journal* 6.1, pp. 41–48.
- Muschelli, J.**, Betz, J., Varadhan, R. "Binomial regression in R". *Handbook of Statistics: Computational Statistics with R* 32, pp. 257–309.
- Muschelli\*, J., Nebel\*, M. B., Caffo, B. S., Barber, A. D., Pekar, J. J., Mostofsky, S. H. "Reduction of motion-related artifacts in resting state fMRI using aCompCor". *NeuroImage* 96, pp. 22–35.
- Eloyan, A., Li, S., **Muschelli, J.**, Pekar, J. J., Mostofsky, S. H., Caffo, B. S. "Analytic programming with fMRI data: a quick-start guide for statisticians using R". *PLOS ONE* 9.2, e89470.
- Nebel, M. B., Joel, S. E., **Muschelli, J.**, Barber, A. D., Caffo, B. S., Pekar, J. J., Mostofsky, S. H. "Disruption of functional organization within the primary motor cortex in children with autism". *Human Brain Mapping* 35.2, pp. 567–580.
- 2013 Mould, W. A., Carhuapoma, J. R., **Muschelli, J.**, Lane, K., Morgan, T. C., McBee, N. A., Bistran-Hall, A. J., Ullman, N. L., Vespa, P., Martin, N. A., Awad, I., Zuccarello, M., Hanley, D. F. "Minimally invasive surgery plus recombinant tissue-type plasminogen activator for intracerebral hemorrhage evacuation decreases perihematomal edema". *Stroke* 44.3, pp. 627–634.
- Mould, W., Carhuapoma, J., **Muschelli, J.**, Lane, K., Morgan, T., McBee, N., Bistran-Hall, A., Ullman, N., Vespa, P., Martin, N., Awad, I., Zuccarello, M., Hanley, D. F. "MISTIE investigators: minimally invasive surgery plus recombinant tissue-type plasminogen activator for intracerebral hemorrhage evacuation decreases perihematomal edema". *Stroke* 44.3, pp. 627–634.
- 2012 Bundy, D. G., **Muschelli, J.**, Clemens, G. D., Strouse, J. J., Thompson, R. E., Casella, J. F., Miller, M. R. "Ambulatory care connections of medicaid-insured children with sickle cell disease". *Pediatric Blood & Cancer* 59.5, pp. 888–894.
- Eloyan, A., **Muschelli, J.**, Nebel, M. B., Liu, H., Han, F., Zhao, T., Barber, A. D., Joel, S., Pekar, J. J., Mostofsky, S. H., others, "Automated diagnoses of attention deficit hyperactive disorder using magnetic resonance imaging". *Frontiers in Systems Neuroscience* 6, p. 6.

Hinson, H. E., Melnychuk, E., **Muschelli, J.**, Hanley, D. F., Awad, I. A., Ziai, W. C. "Drainage efficiency with dual versus single catheters in severe intraventricular hemorrhage". *Neurocritical Care* 16.3, pp. 399–405.

Jaffe, J., Melnychuk, E., **Muschelli, J.**, Ziai, W., Morgan, T., Hanley, D. F., Awad, I. A. "Ventricular catheter location and the clearance of intraventricular hemorrhage". *Neurosurgery* 70.5, pp. 1258–1264.

Webb, A. J., Ullman, N. L., Mann, S., **Muschelli, J.**, Awad, I. A., Hanley, D. F. "Resolution of intraventricular hemorrhage varies by ventricular region and dose of intraventricular thrombolytic the clot lysis: evaluating accelerated resolution of IVH (CLEAR IVH) program". *Stroke* 43.6, pp. 1666–1668.

Ziai, W. C., **Muschelli, J.**, Thompson, C. B., Keyl, P. M., Lane, K., Shao, S., Hanley, D. F. "Factors affecting clot lysis rates in patients with spontaneous intraventricular hemorrhage". *Stroke* 43.5, pp. 1234–1239.

2011 Newell, D. W., Shah, M. M., Wilcox, R., Hansmann, D. R., Melnychuk, E., **Muschelli, J.**, Hanley, D. F. "Minimally invasive evacuation of spontaneous intracerebral hemorrhage using sonothrombolysis". *Journal of Neurosurgery* 115.3, pp. 592–601.

Niedner, M. F., Huskins, W. C., Colantuoni, E., **Muschelli, J.**, Harris, J. M., Rice, T. B., Brill, R. J., Miller, M. R. "Epidemiology of central line-associated bloodstream infections in the pediatric intensive care unit". *Infection Control* 32.12, pp. 1200–1208.

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## Submitted

2016 **Muschelli, J.**, Sweeney, E. M., Ullman, N. L., Vespa, P., Hanley, D. F., Crainiceanu, C. M. "PltchPERFeCT: primary intracranial hemorrhage probability estimation using random forests on CT". *NeuroImage: Clinical*, Submitted.

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## Working Groups

2014–  
Present **Statistical and Applied Mathematical Sciences Institute (SAMSI) working group on Clinical Brain Imaging.**

2012–  
Present **Epidemiology and Biostatistics of Aging (EBA) Training Program Meeting,** *Johns Hopkins University, Center on Aging and Health.*

2014–  
Present **Penn Statistical Imaging and Visualization Endeavor (PennSIVE) Working Group,** *University of Pennsylvania, Department of Biostatistics and Epidemiology.*

2009–  
Present **Statistical Methods and Applications for Research in Technology (SMART) Working Group,** *Johns Hopkins University, Department of Biostatistics.*

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## Talks and Presentations

2016 **Papayar: A Better Interactive Neuroimage Plotter in R,** *Joint Statistical Meeting (JSM), Chicago, IL, Talk.*

2016 **Processing Neuroimaging Data in R: Capabilities,** *Mathematical and Statistical Challenges in Neuroimaging Data Analysis, Banff, AB, Talk.*

- 2016 **Processing fMRI Data in R,**  
*SAMSI Challenges in Functional Connectivity Modeling and Analysis Workshop,*  
 Durham, NC, Talk.
- 2015 **Succeeding in Undergraduate: A Message to Top Students,**  
*Sun Valley High School, Aston, PA, Talk.*
- SuBGELS: Subtraction-Based Gadolinium-Enhancing  
 Lesion Segmentation,**  
*Hopkins Imaging Conference, Baltimore, MD, Poster.*
- Automated Intracerebral Hemorrhage Segmentation of CT Scans,**  
*Joint Statistical Meeting (JSM), Seattle, WA, SPEED Talk and Poster.*
- PltchPERFECT: Primary Intracerebral Hemorrhage Prediction  
 Employing Regression and Features Extracted from CT,**  
*Eastern North American Region (ENAR), Miami, FL, Poster.*
- Quantitative Localization and Predictive Performance of  
 Intracranial Hemorrhage,**  
*International Stroke Conference (ISC), Nashville, TN, Poster.*
- Validated Automatic Brain Extraction of Head CT Images,**  
*Organization for Human Brain Mapping (OHBM), Honolulu, HI, Poster.*
- 2014 **Validated Automatic Brain Extraction of Head CT Images,**  
*Hopkins Imaging Conference, Baltimore, MD, Talk and Poster.*
- Reduction of motion-related artifacts in resting state fMRI  
 using aCompCor,**  
*Hopkins Imaging Conference, Baltimore, MD, Poster.*  
 Award: Top Poster
- 2013 **Visualizing Brain Imaging in Interactive 3D,**  
*ENAR, Orlando, FL, Talk.*
- 2012 **Resting State Preprocessing and Motion Artifacts,**  
*Second Biennial Conference on Resting State, Madgeburg, Germany, Poster.*
- Effects of preprocessing on motion-inuced artifacts in resting state fMRI,**  
*Society for Neuroscience (SfN), New Orleans, LA, Poster.*