

**WAKE FOREST UNIVERSITY SCHOOL OF MEDICINE  
CURRICULUM VITAE**

**NAME:** SATORU HAYASAKA

**CURRENT ACADEMIC TITLE:** Assistant Professor

**ADDRESS:**

Office: Departments of Biostatistical Sciences and Radiology  
Wake Forest University School of Medicine  
Medical Center Blvd.  
Winston-Salem, NC 27157 USA  
Telephone: (336) 716-8504  
Fax: (336) 716-0798

**EDUCATION:**

Concordia University, Montreal, Canada <b>Bachelor of Science</b> in Honours Statistics with Great Distinction	1998
The University of Michigan, Ann Arbor, MI <b>Master of Science</b> in Biostatistics & Public Health Genetics	2000
The University of Michigan, Ann Arbor, MI <b>Doctor of Philosophy</b> in Biostatistics Advisor: Thomas E. Nichols, PhD. Dissertation: Validating and Improving Cluster Size Inference in Brain Image Analysis	2003

**POSTDOCTORAL TRAINING:**

<b>Post-Doctoral Fellowship</b> University of California San Francisco, San Francisco, CA Magnetic Resonance Unit, Department of Radiology Principal Investigator: Michael W. Weiner, M.D.	2005
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**ACADEMIC APPOINTMENTS:**

<b>Graduate Student Instructor</b> The University of Michigan, Ann Arbor, MI Department of Biostatistics	1998
<b>Graduate Student Research Assistant</b> The University of Michigan, Ann Arbor, MI Department of Biostatistics	1999-2003

<p><b>Post-Doctoral Fellow</b>  University of California San Francisco and San Francisco  Veterans Administration Medical Center, San Francisco, CA  Magnetic Resonance Unit, Department of Radiology</p>	<p>2003-2005</p>
<p><b>Assistant Professor</b>  Wake Forest University School of Medicine, Winston-Salem, NC  Departments of Biostatistical Sciences and Radiology</p>	<p>2005-present</p>

**PROFESSIONAL APPOINTMENTS AND SERVICES:**

**Reviewing:**

Ad-hoc Reviewer

Human Brain Mapping (2005 - present)  
IEEE Transactions on Medical Imaging (2006 - present)  
NeuroImage (2006 -present)  
Journal of the American Statistical Association (2007)  
PLoS ONE (2007)  
Academic Radiology (2008)

Abstract Reviewer

12<sup>th</sup> Organization for Human Brain Mapping Conference (2006)  
13<sup>th</sup> Organization for Human Brain Mapping Conference (2007)

**Miscellaneous:**

Organizer, Advanced Neuroscience Imaging Research (ANSIR) Laboratory  
Seminar Series (2006 – present)

**PROFESSIONAL MEMBERSHIPS AND SERVICES:**

**Memberships:**

<p>American Statistical Association (ASA)</p>	<p>2000-present</p>
<p>International Society for Magnetic Resonance in Medicine (ISMRM)</p>	<p>2003-present</p>
<p>Organization for Human Brain Mapping (OHBM)</p>	<p>2002-present</p>

**HONORS AND AWARDS:**

<p><b>Dean’s List</b>, Faculty of Arts and Science, Concordia University</p>	<p>1995-1998</p>
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<p><b>Science College Scholarship</b>, Concordia University</p>	<p>1997</p>
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<p><b>Science College Prize</b>, Concordia University</p>	<p>1998</p>
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<b>Award for Outstanding Performance in Ph.D. Qualifying Examination</b> (Highest score in the qualifying exam)	2000
<b>Trainee Travel Award</b> , 8 <sup>th</sup> Organization for Human Brain Mapping Conference, Sendai, Japan	2002
<b>Trainee Travel Award</b> , 9 <sup>th</sup> Organization for Human Brain Mapping Conference, New York City, USA	2003
<b>Trainee Travel Award</b> , 10 <sup>th</sup> Organization for Human Brain Mapping Conference, Budapest, Hungary	2004
<b>Honorable Mention</b> , Poster Award (Neuroimaging) International Society for Magnetic Resonance in Medicine Conference, Miami Beach, FL, USA	2005

## GRANTS:

### Current and Pending:

NIBIB R01 EB004673 (PI - Maldjian)

07/01/2004 - 06/03/2008

Title: Integrated Tool for Biological Parametric Mapping

The major goal of this project is to develop a scaleable tool for the integration of multimodal imaging data into an extensible user-friendly environment.

Total Grant Amount: \$1,630,799

Role: Biostatistician

NIBIB R01 EB003880 (PI - Laurienti)

04/18/2005 - 01/31/2009

Title: Effect of Caffeine on Functional and Perfusion MRI

The broad, long-term objective of this project is to gain a more thorough understanding of the effects of acute and chronic caffeine consumption on brain activity and blood flow.

Total Grant Amount: \$1,201,749

Role: Biostatistician

NIH R01 MH069326 (PI - Johnson)

04/01/2006-12/31/2008

Title: Nonparametric Inference for Neuroimaging Data

Sub-contract (Hayasaka)

To develop and evaluate new nonparametric methods and build, distribute and support nonparametric software tools.

Total Grant Amount: \$28,613

Role: Co-Investigator

Wake Forest University Translational Scholar Award (PI – Hayasaka)

09/01/2007 – 08/31/2009

Title: Integrating Genomics and Brain Imaging: Mapping Genetic Links Associated with Normal and Abnormal Brain Structure and Function In this project, we will develop a methodological

framework for the combined statistical analysis of brain imaging and genomic data in order to investigate the genetic basis of brain abnormalities.

Total Grant Amount: \$226,811

Role: Principal Investigator

## **BIBLIOGRAPHY:**

### **Journal Articles:**

1. Perrone E, Theoharis C, Mucci N, **Hayasaka S**, Taylor J, Cooney K, Rubin M. Tissue microarray assessment of prostate cancer tumor proliferation in African - American and white men. *Journal of the National Cancer Institute* 92: 937-939. (2000)
2. Hollenbeck B, Bassily N, Wei J, Montie J, **Hayasaka S**, Taylor J, Rubin M. Whole mounted radical prostatectomy specimens do not increase detection of adverse pathological features. *Journal of Urology* 164:1583-1586. (2000)
3. Cooper C, McLean L, Walsh M, Taylor J, **Hayasaka S**, Bhatia J, Pienta K. Preferential Adhesion of Prostate Cancer Cells to Bone is Mediated by Binding to Bone Marrow Endothelial Cells as Compared to Extracellular Matrix Components In Vitro. *Clinical Cancer Research* 6: 4839-4847. (2000)
4. Trask PC, Paterson AG, Wang CL, **Hayasaka S**, Milliron KJ, Blumberg LR, Gonzalez R, Murray S, Merajver SD. Cancer-Specific Worry Interference in Women Attending a Breast and Ovarian Cancer Risk Evaluation Program: Impact on Emotional Distress and Health Functioning. *Psycho-Oncology* 10(5): 349-60. (2001)
5. Trask PC, Paterson AG, **Hayasaka S**, Dunn RL, Riba M, Johnson T. Psychosocial Characteristics of Individuals with Non-Stage IV Melanoma. *Journal of Clinical Oncology* 19(11): 2844-2850. (2001)
6. Zhou M, **Hayasaka S**, Taylor JM, Shah R, Proverbs-Singh T, Manley S, Rubin MA. Lack of association of prostate carcinoma nuclear grading with prostate specific antigen recurrence after radical prostatectomy. *Journal of Urology* 166(6):2193-7. (2001)
7. Cooper CR, Bhatia JK, Muenchen HJ, McLean L, **Hayasaka S**, Taylor JMG, Poncza PJ, and Pienta KJ. The Regulation of Prostate Cancer Cell Adhesion to Human Bone Marrow Endothelial Cell Monolayers by Androgen Dihydrotestosterone and Cytokines. *Clinical and Experimental Metastasis* 19: 25-33. (2002)
8. Beer DG, Kardia SL, Huang CC, Giordano TJ, Levin AM, Misek DE, Lin L, Chen G, Gharib TG, Thomas DG, Lizyness ML, Kuick R, **Hayasaka S**, Taylor JM, Iannettoni MD, Orringer MB, Hanash S. Gene-expression profiles predict survival of patients with lung adenocarcinoma. *Nature Medicine* 8(8):816-24. (2002)
9. Nichols TE, **Hayasaka S**. Controlling the Familywise Error Rate in Functional Neuroimaging: A Comparative Review. *Statistical Methods in Medical Research*. 12: 419-446 (2003)
10. Urba SG, Orringer MB, Iannettoni M, Hayman JA, **Hayasaka S**. Current Cisplatin, Paclitaxel, and Radiotherapy as Preoperative Treatment for Patients with Locoregional Esophageal Carcinoma. *Cancer* 98: 2177-2183. (2003)
11. **Hayasaka S**, Nichols TE. Validating Cluster Size Inference: Random Field and Permutation Methods. *NeuroImage*. 20: 2343-2356. (2003)
12. **Hayasaka S**, Phan KL, Liberzon I, Worsley KJ, and Nichols TE. Non-Stationary Cluster Size Inference with Random Field and Permutation Methods. *NeuroImage*. 22: 676-687. (2004)
13. **Hayasaka S**, and Nichols TE. Combining Voxel Intensity and Cluster Extent with Permutation Test Framework. *NeuroImage*. 23: 54-63. (2004)

14. Ergen FB, Hussain HK, Caoili EM, Korobkin M, Carlos RC, Weadock WJ, Johnson TD, Shah R, **Hayasaka S**, Francis IR. MRI for preoperative staging of renal cell carcinoma using the 1997 TNM classification: comparison with surgical and pathologic staging. *American Journal of Roentgenology* 182: 217-225. (2004)
15. **Hayasaka S**, Du AT, Duarte A, Kornak J, Jahng GH, Weiner MW, and Schuff N. A Non-Parametric Approach for Co-Analysis of Multi-Modal Brain Imaging Data: Application to Alzheimer's Disease. *NeuroImage* 30: 768-779. (2006)
16. Du AT, Jahng G-H, **Hayasaka S**, Kramer JH, Rosen HJ, Gorno-Tempini ML, Rankin KP, Miller BL, Weiner MW, and Schuff N. Hypoperfusion in Frontotemporal Dementia and Alzheimer's Disease by Arterial Spin Labeling MRI. *Neurology*, accepted (2006)
17. Duarte A, **Hayasaka S**, Du A, Schuff N, Jahng GH, Kramer J, Miller B, Weiner M. Volumetric Correlates of Memory and Executive Function in Normal Elderly, Mild Cognitive Impairment and Alzheimer's Disease. *Neuroscience Letters* 406: 60-65. (2006)
18. Casanova R, Ryali S, Baer A, Laurienti PJ, Burdette JH, **Hayasaka S**, Flowers L, Wood FB, Maldjian JA. Biological Parametric Mapping: A Statistical Toolbox for Multi-Modality Brain Image Analysis. *NeuroImage*, 34: 137-143. (2006)
19. Zagoria RJ, Traver MA, Werle DM, Perini M, **Hayasaka S**, Clark PE. Oncologic Efficacy of CT-Guided Percutaneous Radiofrequency Ablation of Renal Cell Carcinomas. *American Journal of Roentgenology*, 189: 429-436 (2007).
20. **Hayasaka S**, Peiffer AM, Hugenschmidt CE, Laurienti PJ. Power and sample size calculation for neuroimaging studies by noncentral random field theory. *NeuroImage*, 37: 721-730 (2007).
21. Hugenschmidt CE, **Hayasaka S**, Peiffer AM, Laurienti PJ. Applying capacity analyses to psychophysical evaluation of multisensory interactions. *Information Fusion*, in press (2007)
22. Peiffer AM, Hugenschmidt CE, Maldjian JA, Casanova R, Srikanth R, **Hayasaka S**, Burdette JH, Kraft RA, Laurienti PJ. Aging and the Interaction of Sensory Cortical Function and Structure. *Human Brain Mapping*, in press. (2007)
23. Hairston WD, Hodges DA, Casanova R, **Hayasaka S**, Kraft RA, Maldjian JA, and Burdette JH. Closing the Mind's Eye: Deactivation of Visual Cortex Related to Auditory Task Difficulty. *NeuroReprt*, 2008; 19(2); 151-154.

#### **Abstracts:**

1. **Hayasaka S** and Nichols TE. A Resel-Based Cluster Size Permutation Test for Non-stationary Images. Organization for Human Brain Mapping Conference, Sendai, Japan. June 2002 (Poster)
2. **Hayasaka S** and Nichols TE. A Cluster Size Permutation Test for Non-Stationary Brain Images. Joint Statistical Meeting, New York City, USA. August 2002 (Oral)
3. Nichols TE and **Hayasaka S**. Comparison of Parametric and Nonparametric Thresholding Methods for Small Group Analyses. Organization for Human Brain Mapping Conference, New York City, USA. June 2003 (Poster)
4. **Hayasaka S** and Nichols TE. Validating Cluster Size Inference: Random Field and Permutation Methods. Organization for Human Brain Mapping Conference, New York City, USA. June 2003 (Poster)
5. **Hayasaka S** and Nichols TE. Validation of the Random Field Theory-based Cluster Size Test in Single-subject fMRI Analyses. International Society for Magnetic Resonance in Medicine Meeting, Toronto, Canada. July 2003 (Oral)
6. **Hayasaka S** and Nichols TE. Brain Image Analysis using the Joint Distribution of Intensity and Spatial Extent. Joint Statistical Meeting, San Francisco, USA. August 2003 (Oral)

7. **Hayasaka S** and Nichols TE. Combining Voxel Intensity and Cluster Extent with a Permutation Test Framework. 2004 IEEE International Symposium on Biomedical Imaging, Arlington VA, USA. April 2004 (Poster)
8. **Hayasaka S** and Nichols TE. Combining Voxel Intensity and Cluster Extent with a Permutation Test Framework. International Society for Magnetic Resonance in Medicine Meeting, Kyoto, Japan. May 2004 (Oral)
9. **Hayasaka S** and Nichols TE. Combining Voxel Intensity and Cluster Extent with a Permutation Test Framework. Organization for Human Brain Mapping Conference, Budapest, Hungary. June 2004 (Poster)
10. **Hayasaka S**, Schuff N, Kornak J, Studholme C, Cardenas, Du AT, Duarte A, Jahng GH, and Weiner M. Identifying Regional Patterns of Concordance and Dissociation between Gray Matter Loss and Hypoperfusion among Alzheimer's Disease Patients. International Society for Magnetic Resonance in Medicine Meeting, Miami Beach, FL, USA. May 2005 (Poster)
11. **Hayasaka S**, Schuff N, Kornak J, and Weiner M. Correcting Partial Volume Effect in Perfusion MRI with Arterial Spin Labeling. Organization for Human Brain Mapping Conference, Toronto, ON, Canada. June 2005 (Poster)
12. **Hayasaka S**, Schuff N, Kornak J, Du AT, Duarte A, Jahng GH, and Weiner M. Identifying Regional Patterns of Concordance and Dissociation between Gray Matter Loss and Hypoperfusion among Alzheimer's Disease Patients. Organization for Human Brain Mapping Conference, Toronto, ON, Canada. June 2005 (Poster)
13. Zhang H, Ding J, **Hayasaka S**, and Nichols TE. Combining Average Voxel Suprathreshold Intensity and Cluster Extent with Permutation Test Framework. Organization for Human Brain Mapping Conference, Florence, Italy. June 2006 (Poster)
14. **Hayasaka S** and Nichols TE. A Comparison of Permutation Test Methods for Correlation Analysis with Nuisance Covariates. Organization for Human Brain Mapping Conference, Florence, Italy. June 2006 (Poster)
15. **Hayasaka S**, Hugenschmidt C, Nichols TE, and Laurienti PJ. VBM Analysis of DTI Data with Non-Parametric Scale Space Search. Organization for Human Brain Mapping Conference, Florence, Italy. June 2006 (Poster)
16. Casanova R, Ryali S, Baer A, Laurienti PJ, **Hayasaka S**, Burdette JH, Wood F, and Maldjian JA. The Biological Parametric Mapping Toolbox. Organization for Human Brain Mapping Conference, Florence, Italy. June 2006 (Oral & Poster)
17. **Hayasaka S**, Peiffer A, Hugenschmidt C, Laurienti PJ. Power Calculation for fMRI Data Analysis with Non-central Random Field Theory. International Society for Magnetic Resonance for Medicine Meeting, Berlin, Germany. May 2007 (Poster)
18. **Hayasaka S**, Peiffer A, Hugenschmidt C, Laurienti PJ. Power and Sample Size Maps for Neuroimaging Studies by Non-central Random Field Theory. Organization for Human Brain Mapping Conference, Chicago, IL, USA. June 2007 (Oral & Poster)
19. Casanova R, **Hayasaka S**, Laurienti PJ, Maldjian JA. Multiple hypotheses testing and family-wise error rate (FWER) control in the context of SPM analyses with voxel-wise covariates: A simulation study. Organization for Human Brain Mapping Conference, Chicago, IL, USA. June 2007 (Poster)
20. Casanova R, **Hayasaka S**, Laurienti PJ, Maldjian JA. A non-parametric approach to SPM analyses with voxel-wise covariates. Organization for Human Brain Mapping Conference, Chicago, IL, USA. June 2007 (Poster)
21. Schuff N, Zhang Y, Zhu XP, Zhan W, Young K, **Hayasaka S**, Weiner MW. Analysis of Multimodal MRI in Neurodegenerative Diseases. Biomedical Engineering Society Annual Fall Meeting, Los Angeles, CA, USA. September 2007 (Oral)

22. Hugenschmidt CE, Peiffer AM, McCoy TP, **Hayasaka S**, Laurienti PJ. Preservation of modality-specific selective attention in healthy older adults. Society for Neuroscience, San Diego, CA, USA. November 2007.
23. Yang LL, Casanova R, Peiffer AM, Addicott MA, Kraft RA, Maldjian JA, Burdette JH, **Hayasaka S**, Burnett LR, Chen MY, Laurienti PJ. Society for Neuroscience, San Diego, CA, USA. November 2007.

### Technical Reports:

1. **Hayasaka S**. Parametric Cluster Size Tests: A Comparison between SPM Package and fmrstat Package. Working paper. <http://www.sph.umich.edu/~nichols/Docs/RFReview.pdf> (2002)
2. **Hayasaka S**. Derivation of the Euler Characteristic Densities of Non-Central T- and F-Random Fields. Technical Bulletin, ANSIR Laboratory, Wake Forest University. <http://www.fmri.wfubmc.edu/> (2007)

### PRESENTATIONS:

#### Invited Seminars / Workshops

1. **Hayasaka S**. Non-stationary Cluster Size Inference with a Permutation Test. Olin Neuropsychiatry Research Center, Institute of Living, Hartford, CT. March 2003
2. **Hayasaka S**. Cluster Size Inference for Non-stationary Brain Images with a Permutation Test. MR Unit, San Francisco VA Medical Center and University of California San Francisco. March 2003
3. **Hayasaka S**. Cluster Size Inference for Non-stationary Brain Images with a Permutation Test. Center for Functional Neuroimaging, University of Pennsylvania. April 2003
4. **Hayasaka S** and Nichols TE. Improving Validity and Power of Cluster Size Inference. University of Michigan Functional MRI Fall Symposium. September 2003
5. **Hayasaka S** and Nichols TE. Powerful and Valid Cluster Size Inference with Permutation Methods. In *Permutation Testing in Functional Brain Imaging Workshop at Human Brain Mapping*, Budapest, Hungary. June 2004
6. **Hayasaka S**. Gray Matter Loss and Hypoperfusion among Alzheimer's Disease Patients: Identifying the Relationship. Department of Psychology, University of California Los Angeles. February 2005.
7. **Hayasaka S**. Gray Matter Loss and Hypoperfusion among Alzheimer's Disease Patients: Identifying the Relationship. MIND Institute, Albuquerque, New Mexico. February 2005.
8. **Hayasaka S**. Combined Intensity-Extent Inference in Brain Image Analysis with a Permutation Test Framework. Department of Mathematics and Statistics, University of New Mexico. February 2005.
9. **Hayasaka S**. Gray Matter Loss and Hypoperfusion in Alzheimer's Disease: Identifying the Relationship. Cognitive Science, University of California Irvine. March 2005.
10. **Hayasaka S**. Changes in Brain Structure and Function in Alzheimer's Disease: Identifying the Relationship. Biostatistics and Radiology, Wake Forest University School of Medicine, Winston-Salem, North Carolina. March 2005.

## Tutorials / Other Talks

1. **Hayasaka S.** Neuroanatomy for Dummies. Short course in functional MRI, University of Michigan. August 2002.
2. **Hayasaka S.** Cluster Size Inference in Brain Image Analysis: a Brief Overview. Biomagnetic Imaging Lab, University of California San Francisco. May 2004.
3. **Hayasaka S.** Introduction to Statistical non-Parametric Mapping for Functional Neuroimaging. Center for Molecular and Functional Imaging, University of California San Francisco. October 2004.
4. **Hayasaka S.** An Alternative Ending to a T-Test. Biostatistics Tuesday Seminar Series, Wake Forest University School of Medicine. May 2006.
5. **Hayasaka S.** Power Calculation for Brain Imaging Studies. Biostatistics Tuesday Seminar Series, Wake Forest University School of Medicine. November 2006.
6. **Hayasaka S.** Power and Sample Size Maps for Neuroimaging Studies by Non-Central Random Field Theory. Biostatistics Tuesday Seminar Series, Wake Forest University School of Medicine. November 2007.
7. **Hayasaka S.** Integrating Genomics and Brain Imaging: Mapping Genetic Links Associated with Normal and Abnormal Brain Structure and Function. Presentation to Translational Science Institute Steering Committee, Wake Forest University School of Medicine. November 2007.