

**BIOGRAPHICAL SKETCH**

NAME Avison, Malcolm J.	POSITION TITLE Professor of Radiology & Radiological Sciences		
eRA COMMONS USER NAME avisonmj			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Cambridge University	BA	1979	Natural Sciences
Yale University	M Phil	1985	Chemistry
Yale University	PhD	1986	Chemistry

**A. Positions and Honors****Positions and Employment**

- 1979 – 1980 Research Chemist, Courtaulds Ltd, Coventry, U.K.
- 1980 – 1986 Graduate Study, Department of Chemistry, Yale University *Thesis:  $^{23}\text{Na}$  Nuclear Magnetic Resonance Studies of Ion Transport in the Rabbit Proximal Tubule*
- 1986 – 1987 Postdoctoral Research Associate, Department of Molecular Biophysics & Biochemistry, Yale University
- 1987 – 1989 Associate Research Scientist, Department of Molecular Biophysics & Biochemistry, Yale University
- 1989 – 1993 Assistant Professor, Department of Internal Medicine, Yale University
- 1992 – 1993 Lecturer, Department of Molecular Biophysics & Biochemistry, Yale University
- 1993 – 1996 Associate Professor, Departments of Diagnostic Radiology & Biochemistry, University of Kentucky
- 1996 – 2002 Associate Professor, Departments of Neurology & Biochemistry, University of Kentucky
- 2002 – 2003 Professor, Departments of Neurology & Biochemistry, University of Kentucky
- 2003 – pres Professor, Departments of Radiology & Radiological Sciences, Pharmacology, Vanderbilt University

**B. Selected peer-reviewed publications (in chronological order).**

- Petroff OAC, Prichard JW, Ogino T, Avison MJ, Alger JR, Shulman RG. Combined  $^1\text{H}$  and  $^{31}\text{P}$  nuclear magnetic resonance spectroscopic studies of bicuculline-induced seizures in vivo. *Ann Neurol* 1985; 20:185-193.
- Avison MJ, Rothman DL, Nadel E, Shulman RG. Detection of human muscle glycogen by natural abundance  $^{13}\text{C}$  NMR. *Proc Natl Acad Sci USA* 1988; 85:1634-1636.
- Avison MJ, Herskowitz N, Novotny EJ, Petroff OAC, Rothman DL, Colombo JP, Bachman C, Shulman RG, Prichard JW.  $^1\text{H}$  NMR observation of phenylalanine and an aromatic metabolite in the rabbit brain in vivo. *Pediatric Research* 1990; 27:566-570.
- Petroff OAC, Novotny EJ, Ogino T, Avison MJ, Prichard JW. In vivo measurements of ethanol concentration in rabbit brain by  $^1\text{H}$  magnetic resonance spectroscopy. *J Neurochem* 1990; 54:1188-1195.
- Avison MJ, Rothman DL, Nixon TW, Long WS, Siegel NJ.  $^1\text{H}$  NMR study of renal trimethylamine responses to dehydration and acute volume loading in man. *Proc Natl Acad Sci* 1991; 88:6053-6057.
- Prichard J, Rothman D, Novotny E, Petroff O, Kuwabara T, Avison MJ, Howseman A, Hanstock C, Shulman R. Lactate rise detected by  $^1\text{H}$  NMR in human visual cortex during physiologic stimulation. *Proc Natl Acad Sci USA* 1991; 88:5829-5831.
- Petroff OAC, Novotny EJ, Avison MJ, Rothman DL, Alger JR, Ogino T, Shulman GI, Prichard JW. Cerebral lactate turnover after electroshock: In vivo measurements  $^1\text{H}/^{13}\text{C}$  magnetic resonance spectroscopy. *J Cereb Blood Flow Metab* 1992; 12:1022-1029.
- Avison MJ, Van Why S, Siegel NJ. DDAVP does not stimulate acute changes in levels of medullary trimethylamines in man. *J. Am. Soc. Nephrol.* 1993; 4:1379-1384.

- Chen W, Zhu X-H, Avison MJ, Shulman RG. Nuclear magnetic resonance relaxation of glycogen H1 in solution. *Biochemistry*. 1993; 32:9417-9422.
- Chen W, Zhu X-H, Avison MJ, Shulman RG. <sup>1</sup>H nuclear Overhauser enhancements in glycogen in solution. *Biochemistry*. 1993; 32:11483-11487.
- Chen, W, Avison MJ, Bloch G, Shulman RG. 1H nuclear Overhauser enhancements editing of glycogen H1 in vitro and in vivo. *Magn. Reson. Med*. 1994; 31:576-579.
- Novotny EJ, Avison MJ, Herschkowitz N, Petroff OAC, Prichard JW, Seashore MR, Rothman DL. In vivo Measurement of Phenylalanine in Human Brain by Proton NMR Spectroscopy. *Pediatric Research* 1995; 37:244-249.
- Chen Q, Andersen AH, Zhang Z, Ovadia A, Gash DM, Avison MJ. Mapping Drug-Induced Changes in Cerebral R2\* by Multiple Gradient Recalled Echo Functional MRI. *Magn. Reson. Imag*. 1996; 14 (5): 469-476.
- Smith CD, Andersen AH, Chen Q, Blonder LX, Kirsch JE, Avison MJ. Cortical Activation in Confrontation Naming. *NeuroReport*. 1996; 7 (3): 781-785.
- Smith CD, Landrum WR, Carney JM, Landfield PW, Avison MJ. Brain Creatine Kinase Forward Flux by Magnetization Transfer: Effect of Age in Fisher 344 Rats. *Neurobiology of Aging* 1997, 18 (6): 617-622.
- Smith CD, Trevathan E, Zhang M, Andersen AH, Avison MJ. Functional Magnetic Resonance Imaging Evidence for Task-Specific Activation of Developmentally Abnormal Visual Association Cortex. *Ann. Neurol*. 1999, 45: 515-518.
- Zhang Z, Zhang M, Ai Y, Avison MJ, Gash DM. MPTP-Induced Pallidal Lesions in Rhesus Monkeys. *Exp. Neurol*. 1999, 155: 140-149.
- Chen Q, Andersen AH, Zhang Z, Ovadia A, Cass, WA, Gash DM, Avison MJ. Functional MRI of Basal Ganglia Responsiveness to Levodopa in Parkinsonian Rhesus Monkeys. *Exp. Neurol*. 1999, 158: 63-75.
- Andersen AH, Gash DM, Avison MJ. Principal Component Analysis for Generalized Linear Filtering in fMRI. *Magn. Reson. Imag*. 1999, 17: 795-815.
- Andersen AH, Zhang Z, Zhang M, Gash DM, Avison MJ. Age-associated Changes in Rhesus CNS Composition Identified by MRI. *Brain Res*. 1999, 829: 90-98.
- Lou X, Gedney SD, Avison MJ. End Cap Design for Bird Cage Coils in Nuclear Magnetic Resonance Imaging. *IEEE Trans. Magnetics* 1999, 35: 1939-1946.
- Smith CD, Andersen AH, Kryscio RJ, Schmitt FA, Kindy MS, Avison MJ. Altered Brain Activation in Normal Subjects at Risk for Alzheimer's Disease. *Neurology* 1999, 53: 1391-1396.
- Berger JR, Nath A, Greenberg RN, Andersen AH, Greene RA, Bognar A, Avison MJ. Timecourse of MRI post-contrast enhancement in demented and non-demented HIV seropositive patients: evidence for increased blood volume and blood-brain barrier disruption in the basal ganglia. *Neurology* 2000 54(4): 921-926
- Zhang Z, Andersen AH, Avison MJ, Gerhardt GA, Gash DM. Functional MRI of Apomorphine Activation of the Basal Ganglia in Awake Rhesus Monkeys. *Brain Res*. 2000, 852(2): 290-296
- Nath A, Maragos W, Avison MJ, Schmitt F, Berger JR. Acceleration of HIV dementia with methamphetamine and cocaine. *J. Neurovirol* 2001, 7: 66-71.
- Warach S, Pettigrew LC, Dashe JF et al for the Citicoline 010 Investigators. Effect of Citicoline on Ischemic Lesions as Measured by Diffusion-Weighted Magnetic Resonance Imaging. *Ann Neurol*. 2000 48: 713-722.
- Kesler-West ML, Andersen, AH, Smith CD, Avison MJ, Davis CE, Kryscio RJ, Blonder LX. Neural Substrates of Facial Emotion Processing Using fMRI. *Cognitive Brain Research* 2001 11: 213-226.
- Berger JR, Avison MJ. Diffusion Tensor Imaging in HIV Infection: What Is It Telling Us? *Am J. NeuroRadiol*. 2001 22:237-238.
- Smith CD, Andersen AH, Kryscio RJ, Schmitt FA, Kindy, MS, Blonder LX, Avison MJ. Differences in Functional Magnetic Resonance Imaging Activation by Category in a Visual Confrontation Naming Task. *J. Neuroimaging* 2001 11: 165-170.
- Bickle J, Schmithorst V, Holland SK, Avison MJ. Cellular Mechanisms of Sequential Processing in Frontal Regions Revealed Using a Combined Computational - fMRI Methodology. *Proceedings of the World Congress on Neuroinformatics* 2001.
- Smith CD, Andersen AH, Kryscio RJ, Schmitt FA, Kindy MS, Blonder LX, Avison MJ. Women at Risk for Alzheimer's Disease Show Increased Parietal Activation During a Fluency Task. *Neurology* 2002 58: 1197-202.
- Andersen AH, Zhang Z, Avison MJ, Gash DM. Automated Segmentation of Multispectral Brain MR Images. *J. Neurosci Methods* 2002 122: 12-23.
- Avison MJ, Nath A, Berger JR. Understanding Pathogenesis and Treatment of HIV Dementia: A Role for Magnetic Resonance? *Trends Neurosci*. 2002 25: 468-473.

- Avison MJ. Functional Brain Mapping: What is it Good For? Absolutely Nothing? (Comments on The New Phrenology – Uttal, W) *Brain & Mind* 2002 3(3): 367-373.
- Avison MJ, Berger JR, McArthur JC, Nath A. HIV Meningitis and Dementia. In “Clinical Neurovirology” eds. Berger JR & Nath A. 2003 Dekker – Taylor & Francis.
- Berger JR, Avison MJ. The blood brain barrier in HIV infection. *Front. Biosci.* 2004 Sep 01;9:2680-5.
- Avison MJ, Nath A, Greene-Avison R, Schmitt FA, Bales RA, Ethisham A, Greenberg RN, Berger JR. Inflammatory changes and breakdown of microvascular integrity in early human immunodeficiency virus dementia. *J Neurovirol.* 2004 Aug;10(4):223-32.
- Blonder LX, Smith CD, Davis CE, Kesler-West ML, Garrity TF, Avison MJ, Andersen AH. Regional brain response to faces of humans and dogs. *Brain Res Cogn Brain Res.* 2004 20(3) 384-394.
- Avison MJ, Nath A, Greene-Avison R, Schmitt FA, Greenberg RN, Berger JR. Neuroimaging correlates of HIV-associated BBB compromise *Journal of Neuroimmunology* 2004 157(1-2):140-146.
- Fitsanakis VA, Zhang N, Avison MJ, Gore JC, Aschner JL, Aschner M. The Use of Magnetic Resonance Imaging (MRI) in the study of Manganese Neurotoxicity. *Neurotoxicology* 2006 27(5):798-806.

## C. Research Support

### Ongoing Research Support

5R01 MH 071205-02 Haas (PI)  
NIH/NIMH

05/12/05 – 04/30/10

#### *CNS Viral Dynamics and Cellular Immunity During AIDS*

The goal of this project is to characterize the role of the brain as a site of viral replication during HIV infection, the role of HIV-specific immune response in CNS pathogenesis of HIV infection, and the impact of viral replication on tissue injury in the brain.

Role: Co-Investigator

5R21 DA 021034-02 Avison (PI)  
NIH/NIDA

09/30/05 – 08/31/08

#### *Neural Bases of ADHD in Fetal Drug or Alcohol Exposure*

This grant uses MRI to compare and contrast the structural and functional deficits in frontal and parietal circuits that underlie ADHD in children with a history of cocaine or alcohol exposure in utero.

Role: Principal Investigator

2 R01 EB 000214-15A1 Gore (PI)  
NIH/NIBIB

09/08/05 – 07/31/09

#### *Proton Relaxation and Contrast Mechanisms in MRI*

Continue studies to better understand the factors that affect the NMR relaxation properties of protons in tissues and which determine contrast in MR images.

Role: Co-Investigator

5U54 CA 113007-03 Quaranta (PI)  
NIH/NCI

09/30/04 – 08/31/09

#### *Multiscale Mathematical Modeling of Cancer Invasion*

This is a center grant to develop and validate mathematical models of cancer invasion. The imaging core provides support to the investigators on the P50 for imaging studies of in vitro and in vivo models of tumor growth and metastasis.

Role: Investigator and Director Imaging Core

Institutional Discovery Grant Avison (PI)

07/01/06 – 06/30/08

#### *fMRI Mapping of Somatosensory Cortex in Non-Human Primates*

To obtain preliminary functional maps of the neural correlates of benign and painful/noxious stimuli in SI and SII in the anesthetized squirrel monkey. To map the reorganization over time following partial spinal cord transection of the receptive fields for finger pads in SI and SII in the anesthetized owl monkey.

Role: Principal Investigator

Principal Investigator/Program Director (Last, First, Middle): Martin, Peter R.

5T32 EB03817-03 Gore (PI) 07/01/04 – 06/30/09  
NIH/NIBIB  
*Predoctoral Training Program in Biomedical Imaging*  
This application seeks support for a comprehensive pre-doctoral training program in imaging science at Vanderbilt University.  
Role: Mentor

1T32 DA021123-01 Martin (PI) 07/01/06 – 06/30/11  
NIH/NIDA  
*Linking Clinical Phenotypes and Molecular Underpinnings of Addictions*  
To propose the Addiction Psychiatry Interdisciplinary Research Training (APIRT) Program, a consortium between the research intensive Vanderbilt University Medical Center (VUMC) and the historically African American Meharry Medical Center (MMC) to provide training for addiction psychiatrists embarking on combined clinical/research careers in an era of increasing specialized clinical practice, neuroimaging approaches and powerful genetic paradigms, all in the context of high throughput molecular technologies and unprecedented advances in information science. The objective of the APIRT Program is to provide training to meaningfully investigate in interdisciplinary teams using high-performance computing research methodologies in real world settings.  
Role: Co-Investigator

1KO1 AG026366-01A1 Pham (PI) 09/15/06 – 07/31/11  
NIH/NIA  
*Neuro-molecular Imaging of Delivery Across BBB*  
Develop delivery module to carry imaging probe for detection of neurological disorder.  
Role: Mentor

2R25 CA92043-03 Price (PI) 07/01/06 – 06/30/11  
NIH/NCI  
*Multidisciplinary Research Training in Cancer Imaging*  
The goal of this project is to establish a unique training program in cancer imaging research. The program is designed to train both medical post-doctoral candidates and basic-science post-doctoral candidates.  
Role: Mentor

5 R01 MH 063040-06 Avison (PI) 11/01/03 - 08/31/07  
NIH/NIMH (no cost extension)  
*MRI Probes of BBB Integrity in HIV Dementia*  
This study is examining the role of microvascular disruption in the pathogenesis of HIV Dementia.  
Role: Principal Investigator

1S10 RR 020066-01 Avison (PI) 07/01/2004 - 06/30/2007  
NIH/NCRR (no cost extension)  
*High Field MRI/MRS System for Non-human Primates*  
Role: Principal Investigator

**Completed Research Support**

Serono, Inc 01/15/04 – 01/04/06  
*Quantitative Magnetic Resonance Probes of Intrinsic CNS Tissue Properties in MS*  
Role: PI

5R01DC004969-03 09/26/00 – 10/31/05  
NIH/NIDCD  
*MR Predictors of Response to HAART in HIV Dementia*  
Role: Co-Investigator