

**CURRICULUM VITAE - Anne Haney Cross**

**Date:** March 9, 2018

**1. Personal Information:**

- a. Female
- b. Date of Birth: February 27, 1956

**2. Citizenship:**

USA   X   Other           

**3. Address and Telephone Numbers:**

- a. Office: Department of Neurology  
Washington University School of Medicine  
660 South Euclid Ave., Box 8111  
St. Louis, MO 63110  
(314) 747-0405

**4. Present Position:**

Professor of Neurology

**5. Education:**

- a. Undergraduate: B.S. 1976 University of South Alabama  
(Chemistry) summa cum laude
- b. Graduate: M.D. 1980 University of Alabama  
School of Medicine - cum laude
- c. Postgraduate:
  - 1980-81 Medical internship, Mercy Hospital and Medical Center  
San Diego, California
  - 1981-84 Residency in Neurology, George Washington University  
Washington, DC
  - 1984-86 Medical Staff Fellow, Neuroimmunology Branch,  
National Institutes of Health, Bethesda, Maryland
  - 1986-87 Levy Fellow, Department of Virology and Molecular  
Biology, St. Jude Children's Research Hospital,  
Memphis, Tennessee
  - 1987-90 Fellow of the National Multiple Sclerosis Society,  
Dept. of Pathology, Albert Einstein College of  
Medicine

**6. Academic Positions/Employment:**

- 1990-91 Assistant Professor of Neurology and Assistant  
Professor of Pathology (Neuropathology),  
Albert Einstein College of Medicine

1991-1998 Assistant Professor of Neurology, Washington University School of Medicine  
 1998-2003 Associate Professor of Neurology, with tenure, Washington University School of Medicine  
 2001-Present Section Head, Neuroimmunology, Washington University School of Medicine  
 2003-Present Professor of Neurology, Washington University School of Medicine  
 2012-Present Co-Director, Center for Neuroimmunology & Neuroinfectious Diseases, Washington University

**7. National and International Committees:**

2016-2021 ACTRIMS (Americas Committee for Treatment and Research in MS) Advisory Committee and Nominating Committee  
 2016 - Member at Large (elected position) of the Executive Committee of the Consortium of MS Centers Board of Directors  
 2014 - Founding member steering committee of NARCRMS  
 2013-2016 Chair, Research Programs Advisory Committee, National MS Society USA  
 2015-2018 Advisory Committee, Americas Committee for Treatment and Research in MS - ACTRIMS  
 2012-2015 Board of Directors, America's Committee for Treatment and Research in MS -ACTRIMS  
 2011-2015 NINDS Board of Scientific Counselors  
 2008- Executive Committee Member, National Clinical Advisory Board of the National MS Society USA  
 2007-2012 Member, Research Programs Advisory Committee, National MS Society USA  
 2006-2008 Planning committee member, First Keystone Symposium on Multiple Sclerosis, Santa Fe, NM  
 2006-2008 Councilor, Section on MS, American Academy Neurology  
 2005 National MS Society Task Force on Steroid Therapy  
 2003-2004, 2005-2006 Chair, Program Committee, ACTRIMS  
 2001 National MS Society Task Force on Rescue Therapies  
 2001-2006 Scientific Peer Review Committee "A", National Multiple Sclerosis Society  
 1998-2006 Steering Committee for America's Committee for Treatment and Research in MS -ACTRIMS  
 1994-1999 Postdoctoral Fellowship Review Committee, National MS Society

**8. Medical Licensure and Board Certification:**

Missouri (R6P87)  
 1981 Diplomate of the National Board of Medical Examiners

1985 Diplomate of the American Board of Psychiatry and  
Neurology

**9. Military Service:** NA

**10. Honors and Awards:**

2014 Faculty Achievement Award, Washington University  
School of Medicine

2010 President's Achievement Award, Barnes-Jewish Hospital  
Foundation

2007-17 selected as one of "Best Doctors in America"

2006 selected to "Hall of Fame" for Researchers by  
National MS Society

2003 Named the *Manny and Rosalyn Rosenthal-Dr. John  
L. Trotter MS Center Chair in Neuroimmunology*  
in Barnes-Jewish Hospital Foundation

1998-99, 2001-04 selected as one of "Best Doctors in America"

1996 elected to American Neurological Association

1990-1995 Harry Weaver Neuroscience Scholar of the  
National Multiple Sclerosis Society

1973 National Merit Scholarship Recipient

1972 United States Presidential Scholar

**11. Editorial Responsibilities:**

2014- Advisory Board member, Brain

2013-2106 Founding Associate Editor, Annals of Clinical and  
Translational Neurology

2008-2015 Editorial Board, Brain Pathology

2007 Editor, **CONTINUUM** on Multiple Sclerosis (AAN  
publication)

1996- Editorial Board, Journal of Neuroimmunology

1996-2004 Editorial Board, Neurology

**12. Professional Societies and Organizations:**

1996 American Neurological Association, elected member

1987 International Society of Neuroimmunology

1982 American Academy of Neurology  
1978 Alpha Omega Alpha

**13. Major Invited Professorships and Lectureships (past 5 years):**

1. "Revival of interest in B-cells in MS pathogenesis" Neurology Grand Rounds, Weill Cornell Medical College, New York, NY. January 13, 2016.
2. "Déjà Vu All Over Again: The Revival of Interest in the Role of B Cells in MS" John Whitaker Memorial Lecture, Consortium of MS Centers annual meeting, May 29, 2015
3. "Update on Multiple Sclerosis" delivered at Plenary Session of American Academy of Neurology annual meeting, Philadelphia PA May 2, 2014
4. MS Translation Symposium Director and Speaker, American Academy of Neurology Annual Meeting, March 22, 2013, San Diego CA

**14. Board memberships**

2015- Scientific Advisory Board, Race to ERASE MS

**15. Major Research Support (non-industry)**

1. National Institutes of Health NINDS 2P01 NS059560-01 "Biomarkers and pathogenesis of MS: From Mouse to Human" **Overall Principal Investigator**, and PI of Project 3 and Core A. 2008-2019
2. Conrad N. Hilton Foundation "The Marilyn Hilton Award for Innovation in MS Research" Cross (PI) January 2015 - December 2019 \$900,000 direct

**16. Clinical Title and Responsibilities**

Professor of Neurology, with tenure  
Head, Section of Neuroimmunology  
Co-Director, The John L. Trotter MS Center (with Becky Parks MD)  
Co-Director, Center for Neuroimmunology and NeuroInfectious Diseases (with Robyn Klein MD, PhD)

**17. Bibliography:**

**Selected Peer-reviewed articles (h-Index = 63 as of 2/2018)**

1. **Cross AH, Cannella B, Brosnan CF, Raine CS:** Homing to central nervous system vasculature by antigen specific lymphocytes. I. Localization of <sup>14</sup>C-labeled cells during acute, chronic and relapsing experimental allergic encephalomyelitis. Lab Invest 1990;63:162-170

2. Raine CS, Cannella B, Duijvestijn AM, **Cross AH**: Homing to central nervous system vasculature by antigen specific lymphocytes. II. Lymphocyte-endothelial cell adhesion during the initial stages of autoimmune demyelination. *Lab Invest* 1990;476-489
3. Cannella B, **Cross AH**, Raine CS: Up-regulation and co-expression of adhesion molecules correlate with relapsing autoimmune demyelination in the central nervous system. *J Exp Med* 1990;172:1521-1524
4. Selmaj K, Raine CS, **Cross AH**: Anti-tumor necrosis factor therapy abrogates autoimmune demyelination. *Ann Neurol* 1991;30:694-700
5. **Cross AH**, Tuohy VK, Raine CS: Development of reactivity to new myelin antigens during relapsing autoimmune demyelination. *Cell Immunol* 1993;146:261-269
6. Lin RF, Lin T-S, Tilton RG, **Cross AH**: Nitric oxide localized to spinal cords of mice with experimental allergic encephalomyelitis. An electron paramagnetic resonance study. *J Exp Med* 1993;178:643-648
7. **Cross AH**, Misko TP, Lin RF, Hickey WF, Trotter JL, Tilton RG: Aminoguanidine, an inhibitor of inducible nitric oxide synthase, ameliorates experimental autoimmune encephalomyelitis. *J Clin Invest* 1994;93:2684-2690 PMID: PMC294515
8. **Cross AH**, Girard TJ, Giacoletto KS, Evans RJ, Trotter JL, Karr RW: Long-term inhibition of murine experimental autoimmune encephalomyelitis using CTLA-4-Fc. Supports a key role for CD28 costimulation. *J Clin Invest* 1995;95:2783-2789 PMID: PMC295963
9. Hewett SJ, Misko TP, Keeling RM, Behrens MM, Choi DW, **Cross AH**: Murine encephalitogenic lymphoid cells induce nitric oxide synthase in primary astrocytes. *J. Neuroimmunol.* 1996; 64: 201-208.
10. **Cross AH**, Keeling RM, Goorha S, San M, Rodi C, Wyatt PS, Manning PT, Misko TP: Inducible nitric oxide synthase gene expression and enzyme activity correlate with disease activity in adoptively-transferred murine EAE. *J. Neuroimmunol.* 1996; 71:145-153.
11. **Cross AH**, Manning PT, Stern MK, and Misko TP. Evidence for the production of peroxynitrite in inflammatory CNS demyelination. *J. Neuroimmunol.* 1997; 80:121-130.
12. **Cross AH**, Manning PT, Keeling RM, and Misko TP: Peroxynitrite formation within the central nervous system in active multiple sclerosis. *J. Neuroimmunol.* 1998; 88:45-56.
13. **Cross AH**, San M, Keeling RM, and Karr RW: CTLA-4-Fc treatment of ongoing EAE improves recovery, but has no effect upon relapse rate. Implications for the mechanisms involved in disease perpetuation. *J. Neuroimmunol.* 1999; 96:144-147.
14. Lyons JA, San M, Happ MP, and **Cross AH**: B-cells are critical to induction of experimental allergic

- encephalomyelitis by protein but not by a short encephalitogenic peptide. *Eur. J. Immunol.* 1999; 29: 3432-3439.
15. Avasarala J, **Cross AH**, Trotter JL: Oligoclonal band number as a marker for prognosis in multiple sclerosis. *Archives Neurol.* 2001; 58: 2044-2045.
  16. Lyons JA, Ramsbottom MJ, **Cross AH**: Critical role of antigen-specific antibody in EAE induced by recombinant MOG. *Eur. J. Immunol.* 2002; 32: 1905-1913.
  17. Song, SK, Sun S-W, Ramsbottom MJ, Chang C, Russell J, **Cross AH**: Dysmyelination revealed through MRI as increased radial (but unchanged axial) diffusion of water. *Neuroimage* 2002; 17: 1429-1436.
  18. Song SK, Sun SW, Ju WK, Lin SJ, **Cross AH**, Neufeld AH: Diffusion tensor imaging detects and differentiates axon and myelin degeneration in mouse optic nerve after retinal ischemia. *NeuroImage* 2003; 20: 1714-1722.
  19. Attarian HP, Brown KM, Duntley SP, **Cross AH**: The relationship of sleep disturbances to fatigue in multiple sclerosis. *Arch. Neurol.* 2004; 61: 535-538.
  20. Song SK, Yoshino J, Le TQ, Lin S-J, Sun S-W, **Cross AH**, Armstrong RC. Demyelination increases radial diffusivity in corpus callosum of mouse brain. *Neuroimage* 2005; 26:132-140.
  21. Stark J, **Cross AH**: Differential Expression of Suppressors of Cytokine Signaling-1 and -3 and Related Cytokines in Central Nervous System During Remitting versus Non-remitting Forms of Experimental Autoimmune Encephalomyelitis. *Int Immunol* 2006; 18:347-353.
  22. Naismith RT, Trinkaus K, **Cross AH**: Phenotype and prognosis in African-Americans with multiple sclerosis: a retrospective chart review. *Multiple Sclerosis* 2006; 12: 775-781.
  23. **Cross AH**, Stark JL, Ramsbottom MJ, Lauber J, Lyons JA: Rituximab reduces B cells and T cells in cerebrospinal fluid of multiple sclerosis patients. *J. Neuroimmunol.* 2006; 180:63-70. PMID: PMC1769354
  24. Rinker JR II, Trinkaus K, **Cross AH**: Elevated CSF free kappa light chains correlate with disability prognosis in multiple sclerosis. *Neurology* 2006; 67:1288-1290.
  25. Rinker JR II, Trinkaus K, Naismith RT, **Cross AH**: Higher IgG Index found in African-Americans versus caucasians with MS. *Neurology* 2007; 69:68-72.
  26. Piccio LM, Stark JL, **Cross AH**: Chronic Calorie Restriction Attenuates Experimental Autoimmune Encephalomyelitis. *J Leuk Biol* 2008; 84:940-948. PMID: PMC2638732
  27. Piccio LM, Buonsanti C, Schmidt RE, Rinker J, Panina-Bordignon P, Cella M, Colonna M, **Cross AH**: Identification of a novel soluble TREM-2 protein in the cerebrospinal fluid in

- association with central nervous system inflammation. *Brain* 2008; 131: 3081-3091 PMID: PMC2577803
28. Naismith RT, Tutlam NT, Xu J, Klawiter EC, Shepherd JB, Trinkaus K, Song SK, **Cross AH**. Optical coherence tomography differs in neuromyelitis optica compared with multiple sclerosis. *Neurology* 2009; 72: 1077-1082 PMID: PMC2677471
  29. Naismith RT, Xu J, Tutlam NT, Snyder A, Benzinger T, Shimony J, Shepherd J, Trinkaus K, **Cross AH**, Song SK. Disability in optic neuritis correlates with diffusion tensor-derived directional diffusivities. *Neurology* 2009; 72: 589-94. PMID: PMC2672917
  30. Naismith RT, Xu J, Tutlam N, Scully PT, Trinkaus K, Snyder AZ, Song SS, **Cross AH**. Increased Diffusivity in Acute Multiple Sclerosis Lesions Predicts Risk of Black Holes. *Neurology* 2010; 74:1694-701. PMID:2882210
  31. Naismith RT, Piccio L, Lyons JA, Lauber J, Tutlam NT, Parks BJ, Trinkaus K, Song SK, **Cross AH**: Rituximab add-on therapy for breakthrough relapsing multiple sclerosis: a 52-week phase II trial. *Neurology* 2010; 74: 1860-1867 PMID: PMC2882224
  32. Piccio L, Naismith RT, Trinkaus K, Klein RS, Parks BJ, Lyons JA, **Cross AH**. Changes in B and T lymphocytes and chemokines with rituximab treatment in multiple sclerosis. *Arch Neurol* 2010; 67: 707-714. PMID: PMC2918395
  33. Klawiter EC, Piccio L, Lyons JA, Mikesell R, O'Connor KC, **Cross AH**. Elevated intrathecal myelin oligodendrocyte glycoprotein antibodies in Multiple Sclerosis. *Arch Neurol*. 2010; 67: 1102-1108. PMID: PMC3051403
  34. Wang Y, Wang Q, Haldar JP, Yeh FC, Xie M, Sun P, Trinkaus K, Klein RS, **Cross AH**, Song S-K. Quantification of increased cellularity during inflammatory demyelination. *Brain* 2011; 134: 3587-9 PMID: PMC3235568
  35. Naismith RT, Xu J, Tutlam NT, Lancia S, Trinkaus K, Song SK, **Cross AH**. Diffusion Tensor Imaging in Acute Optic Neuropathies. Predictor of Clinical Outcomes. *Arch Neurol* 2012; 69: 65-71. PMID:PMC3489058
  36. Klawiter EC, Xu J, Naismith RT, Benzinger TLS, Shimony JS, Lancia S, Snyder AZ, Trinkaus K, Song SK, **Cross AH**. Increased radial diffusivity in spinal cord lesions in neuromyelitis optica compared with multiple sclerosis. *Mult Scler* 2012; 18: 1259-68. PMID: PMC3360125.
  37. Alvarez E, Piccio L, Mikesell RJ, Klawiter EC, Parks BJ, Naismith RT, **Cross AH**. CXCL13 is a Biomarker of Inflammation in Multiple Sclerosis, Neuromyelitis Optica, and Other Neurological Conditions. *Mult Scler*. 2013;19:1204-8. PMID: PMC3959125
  38. Naismith RT, Xu J, Klawiter EC, Lancia S, Tutlam NT, Wagner JM, Qian P, Trinkaus K, Song SK, **Cross AH**. Spinal cord tract

- diffusion tensor imaging reveals disability substrate in demyelinating disease. *Neurology*. 2013; 80:2201-9. PMID:PMC3721096
39. Piccio L, Cantoni C, Ramsbottom M, Mikesell B, Cremasco V, Haynes W, Dong LQ, Chan L, Galimberti D, **Cross AH**. Lack of adiponectin leads to increased lymphocyte activation and worse severity of a mouse model of multiple sclerosis. *Eur J Immunol* 2013; 43: 2089-2100. PMID:PMC3901539
  40. Luo J, Yablonskiy DA, Lancia S, Hildebolt C, **Cross AH**. Gradient echo magnetic resonance imaging correlates with clinical measures and allows visualization of veins within multiple sclerosis lesions. *Mult Scler J* 2013; 20: 349-355. PMID: 23836876
  41. Lin TH, Spees WM, Chiang CW, Trinkaus K, **Cross AH**, Song, SK. Diffusion fMRI detects white-matter dysfunction in mice with acute optic neuritis. *Neurobiol Dis* 2014;67:1-8. PMID: PMC4035476
  42. Wang Y, Sun P, Wang Q, Trinkaus K, Naismith RT, **Cross AH**, Song SK. Differentiation and quantification of inflammation, demyelination, and axon injury/loss in MS. *Brain*.2015;138(Pt 5):1223-38.
  43. Longbrake EE, Cross AH. Dimethyl Fumarate Associated Lymphopenia in Clinical Practice. *Mult Scler*. 2015;21:796-7. PMID: PMC44260201.
  44. Longbrake EE, Wu GF, Parks BJ, Naismith RT, **Cross AH**. Dimethyl fumarate-associated lymphopenia: Risk factors and clinical significance. *Mult Scler J Exp Transl Clin*. 2015;1. pii: 2055217315596994. Epub 2015 Jul 31. PMID: PMC4636217
  45. Wen J, Yablonskiy D, Luo J, Lancia S, Hildebolt C, **Cross AH**. Detection and quantification of regional cortical gray matter damage in multiple sclerosis utilizing gradient echo MRI *NeuroImage: Clinical* 2015; 9:164-175. PMID: PMC4907986.
  46. Longbrake EE, Ramsbottom MJ, Cantoni C, Ghezzi L, **Cross AH**, Piccio L. Dimethyl fumarate selectively reduces memory T cells in multiple sclerosis. *Mult Scler*. 2016;22:1061-70. PMID: PMC4829494
  47. Alvarez EE, Piccio L, Mikesell RJ, Trinkaus K, Parks BJ, Naismith RT, **Cross AH**. Predicting optimal response to B cell depletion with rituximab in Multiple Sclerosis using CXCL13 index, MRI and clinical measures. *Mult Scler J: Exp, Transl Clin* 2015 DOI: 10.1177/2055217315623800
  48. Solomon AJ, Bourdette DN, **Cross AH**, Applebee A, Skidd PM, Howard DB, Spain RI, Cameron MH, Kim E, Mass MK, Yadav V, Whitham RH, Longbrake EE, Naismith RT, Wu GF, Parks BJ, Wingerchuk DM, Rabin BL, Toledano M, Tobin WO, Kantarci OH, Carter JL, Keegan BM, Weinshenker BG. The contemporary



- spectrum of multiple sclerosis misdiagnosis: A multicenter study. *Neurology*. 2016;87:1393-9.PMCID: PMC5047038
49. Longbrake EE, Cantoni C, Chahin S, Cignarella F, **Cross AH**, Piccio L. Dimethyl fumarate induces changes in B- and T-lymphocyte function independent of the effects on absolute lymphocyte count. *Mult Scler*. 2017 May 1:1352458517707069. doi: 10.1177/1352458517707069.
  50. Klein RS, Voskuhl R, Segal BM, Dittel BN, Lane TE, Bethea JR, Carson MJ, Colton C, Rosi S, Anderson A, Piccio L, Goverman JM, Benveniste EN, Brown MA, Tiwari-Woodruff, Harris TH, **Cross AH**. Speaking out about gender imbalance in invited speakers improves diversity. *Nat Immunol*. 2017; 18:475-478. doi: 10.1038/ni.3707. PMID: 28418385
  51. Wen J, Yablonskiy DA, Salter A, **Cross AH**. Limbic system damage in MS: MRI assessment and correlations with clinical testing. *PLoS One* 2017 Nov 9;12(11):e0187915.
  52. Evans E, Piccio L, **Cross AH**. Vitamins and dietary supplements in multiple sclerosis. A review. *JAMA Neurology* (*in press*)