

CURRICULUM VITAE  
The Johns Hopkins University School of Medicine

Elisabeth Breese Marsh, MD FAHA

February 2016

**DEMOGRAPHIC AND PERSONAL INFORMATION**

**Current Appointments**

- 2012-present Assistant Professor, Department of Neurology, Cerebrovascular Division, The Johns Hopkins Hospital, Baltimore, MD
- 2012-present Co-Director, Johns Hopkins Intracerebral Hemorrhage Center, Johns Hopkins Bayview Medical Center, Baltimore, MD
- 2013-present Co-Associate Program Director, Neurology Residency, Johns Hopkins School of Medicine, Baltimore, MD
- 2013-present Co-Director, Johns Hopkins Bayview Stroke Intervention Clinic (BaSIC), Johns Hopkins Bayview Medical Center, Baltimore, MD
- 2014-present Director, Stroke Center, Johns Hopkins Bayview Medical Center, Baltimore, MD

**Personal Data**

Offices:

The Johns Hopkins Hospital  
Department of Neurology  
Phipps 446C  
600 N. Wolfe Street  
Baltimore, MD 21287

Johns Hopkins Bayview Medical Center  
Department of Neurology  
301 Mason F. Lord Drive  
Suite 2108  
Baltimore, MD 21224

**Education and Training**

Undergraduate

- 2003 B.A., Neuroscience, The Johns Hopkins University, Baltimore, MD

Doctoral/graduate

- 2007 M.D., The Johns Hopkins University School of Medicine, Baltimore, MD

Postdoctoral

- 2008 Intern, Internal Medicine, The Johns Hopkins Bayview Medical Center, Baltimore, MD
- 2011 Resident, Neurology, The Johns Hopkins Hospital, Baltimore, MD
- 2012 Research and Clinical Fellow under Rafael Llinares, Vascular Neurology, The Johns Hopkins Hospital, Baltimore, MD

**Professional Experience**

- 2012 Assistant Professor of Neurology, The Johns Hopkins University School of Medicine, Baltimore, MD
- 2012 Co-Director, Johns Hopkins Intracerebral Hemorrhage Center, Johns Hopkins Bayview Medical Center, Baltimore, MD
- 2013 Co-Associate Program Director, Neurology Residency, Johns Hopkins School of Medicine, Baltimore, MD
- 2013 Co-Director, Johns Hopkins Bayview Stroke Intervention Clinic (BaSIC), Johns Hopkins Bayview Medical Center, Baltimore, MD
- 2014 Director, Stroke Center, Johns Hopkins Bayview Medical Center, Baltimore, MD

**PUBLICATIONS:**

**Original Research [OR]** (\*corresponding author; \_\_ mentees)

1. **Breese EL**, Hillis AE. Auditory comprehension: is multiple choice really good enough? *Brain and Language*, 2004;89:3-8.
2. Hillis AE, Barker PB, Wityk RJ, Aldrich EM, Restrepo L, **Breese EL**, Work M. Variability in subcortical

- aphasia is due to variable sites of cortical hypoperfusion. *Brain and Language*, 2004;89: 524-530.
3. Hillis AE, Chang S, **Breese E**, Heidler J. The crucial role of posterior frontal regions in modality specific components of the spelling process. *Neurocase*, 2004;10:175-187.
  4. Hillis AE, Work M, Barker PB, Jacobs MA, **Breese EL**, Mauer K. Re-examining the brain regions crucial for orchestrating speech articulation. *Brain*, 2004;127: 1479-1487.
  5. Hillis AE, Newhart M, Heidler J, **Breese Marsh E**, Barker PB, Degaonkar M. The neglected role of the right hemisphere in spatial representation of words for reading. *Aphasiology*, 2005;19: 225-238.
  6. **Marsh EB**, Hillis AE. Cognitive and neural mechanisms underlying reading and naming: evidence from letter-by-letter reading and optic aphasia. *Neurocase*, 2005;11: 325-337.
  7. **Marsh EB**, Freeman JM, Kossoff EH, Vining EPG, Rubenstein JE, Pyzik PL, Hemingway C. The outcome of children with intractable seizures: a 3-6 year follow-up of 67 children who remained on the ketogenic diet less than one year. *Epilepsia*, 2006;47: 425-430.
  8. Philipose LE, Newhart M, Kleinman JT, Gottesman R, Herskovits EH, Pawlak MA, **Marsh EB**, Davis C, Heidler-Gary J, Hillis AE. Neural regions essential for reading and spelling of words and pseudowords. *Annals of Neurology*, 2007;62: 481-492.
  9. **Marsh EB**, Hillis AE. Dissociation between egocentric and allocentric visuospatial and tactile neglect in acute stroke. *Cortex*, 2008;44: 1215-1220.
  10. **Marsh EB**, Newhart M, Kleinman JT, Heidler-Gary J, Vining EP, Freeman JM, Hillis AE. Hemispherectomy sustained before adulthood does not cause persistent hemispatial neglect. *Cortex*, 2009;45: 677-685.
  11. **Marsh EB**, Zeiler SR, Levy M, Llinas RH, Urrutia VC. Diagnosing CNS Vasculitis: the case against empiric treatment. *The Neurologist*, 2012;18: 233-238. [QI]
  12. **Marsh EB**, Gottesman RF, Hillis AE, Urrutia VC, Llinas RH. Serum creatinine may indicate risk of symptomatic intracranial hemorrhage after iv tpa. *Medicine*, 2013;92:317-323. [QI]
  13. **\*Marsh EB**, Llinas RH, Hillis AE, Gottesman RF. Hemorrhagic transformation in patients with acute ischemic stroke and an indication for anticoagulation. *European Journal of Neurology*, 2013;20:962-967.
  14. Faigle R, Sharrief AZ, **Marsh EB**, Llinas RH, Urrutia VC. Predictors of critical care needs after iv thrombolysis for acute ischemic stroke. *PLoS ONE*, 2014;9(2): e88652.
  15. **\*Kaplan EH**, Gottesman RF, Llinas RH, **Marsh, EB**. The association between specific substances of abuse and subcortical intracerebral hemorrhage versus ischemic lacunar infarction. *Frontiers in Neurology*, 2014;5:174.
  16. **\*Marsh EB**, Gottesman RF, Hillis AE, Maygers J, Lawrence E, Llinas RH. Predicting symptomatic intracerebral hemorrhage versus lacunar disease in patients with longstanding hypertension. *Stroke*, 2014;45:1679-1683.
  17. **\*Marsh EB**, Llinas RH. "Stuttering lacunes": an acute role for clopidogrel? *Journal of Neurology and Translational Neuroscience*, 2014;2(1):1035-1038.
  18. Popma JJ, Adams, DH, Reardon MJ, Yakobov SJ, Kleiman NS, Heimansohn D, et al. and **Corevalve United States Clinical Investigators**. Transcatheter aortic valve replacement using a self-expanding bioprosthesis in patients with severe aortic stenosis at extreme risk for surgery. *J Am Coll Cardiol*, 2014;63:1972-1981. *Site neurologist*.
  19. Faigle R, **Marsh EB**, Llinas RH, Gottesman RF, and Urrutia VC. A novel score predicting gastrostomy tube placement in intracerebral hemorrhage. *Stroke*, 2015;46(1):31-36.
  20. Faigle R, **Marsh EB**, Llinas RH, Urrutia VC. Critical care needs in patients with diffusion-weighted imaging negative MRI after tPA - Does one size fit all? *PLoS ONE*, 2015;10(10):e0141204.
  21. Faigle R, **Marsh EB**, Llinas RH, Urrutia VC, Gottesman RF. Troponin elevation predicts critical care needs and in-hospital mortality after thrombolysis in white but not black patients. *J Crit Care* 2015 Dec 2.
  22. Faigle R, Wozniak A, **Marsh EB**, Llinas RH, and Urrutia VC. Infarct volume predicts critical care needs in stroke patients treated with intravenous thrombolysis. *Neuroradiology*, 2015;57(2):171-178.
  23. Faigle R, **Marsh EB**, Llinas RH, Urrutia VC, Gottesman RF. ICAT: a simple score predicting critical care needs after thrombolysis in stroke patients. *Crit Care* 2016;20(1):26.
  24. **\*Marsh EB**, Llinas RH, Schneider ALC, Hillis AE, Lawrence E, Dziedzic P, Gottesman RF. Predicting hemorrhagic transformation of acute ischemic stroke: prospective validation of the HeRS score. *Medicine*, 2016;25:e2430. [QI]
  25. **\*Marsh EB**, Lawrence E, Gottesman RF, Llinas RH. The NIH stroke scale has limited utility in accurate daily monitoring of neurologic status. *Neurohospitalist*, in press.

1. **Marsh EB**, Gottesman RF. Brain hemorrhage: restarting anticoagulation after intracranial hemorrhage. *Nature Reviews Neurology*, 2011;7: 130-132.
2. \*Lee PR, **Marsh EB**. Mentoring in neurology: filling the residency gap in academic mentoring. *Neurology*, 2014;82(10):e85-e88.

#### Case Reports [CR] (\*corresponding author)

1. **Marsh EB**, Chow GV, Rastegar DA, Antonarakis ES. A cut above. *The American Journal of Medicine*, 2007;120: 1031-1033.
2. \***Marsh EB**, Ng K, Llinas R. The Vanishing Clot. *The Journal of Neurology and Translational Neuroscience*, 2013;1:1006.
3. **Marsh EB**, Leigh R, Radvany M, Gailloud P, Llinas RH. Collateralization: an important determinant of prolonged ischemic penumbra versus rapid cerebral infarction. *Frontiers in Neurology*, 2014;5:208.

#### Book Chapters, Monographs [BC]

1. Hillis AE, **Breese EL**. Aphasia recovery: stages and mechanisms. In A. Freddi (ed.) *Stroke Today*. Rome: San Raffaele Termini, 2003;288-297.
2. **Marsh EB**, Hillis AE. Recovery from Aphasia following Brain Injury: the Role of Reorganization. In A. Møller, S. Bond Chapman, and S. G. Lomber (eds.) *Reprogramming the Human Brain: a volume of Progress in Brain Research*. Amsterdam: Elsevier Science, 2006;Volume 157: 143-156.
3. **Marsh EB**, Hillis AE. Aphasia and Stroke. In L. Caplan, J.P. Mohr, and J. van Gijn's (eds.) *Stroke Syndromes*, 4th Ed. Cambridge: Cambridge University Press, 2012;184-194.

#### Books, Textbooks [BK]

None.

#### Other Publications

#### Editorials [ED]

1. 2014 Top Stories in Neurology: Statin Therapy; Practice Update  
<http://www.practiceupdate.com/author/Elisabeth-Marsh>
2. Neurology PracticeChanger in 2015: Advances in Acute Stroke Treatment; Practice Update  
<http://www.practiceupdate.com/author/Elisabeth-Marsh>
3. Midlife Hypertension and 20-Year Cognitive Change; Practice Update  
<http://www.practiceupdate.com/author/Elisabeth-Marsh>

#### Published Curricula [PC], Learner Assessment Tools, Educational Evaluations, Assessment/Evaluation Instruments [PC] iTUNES U Video Courses (2014)

Johns Hopkins Bayview Neurology Junior Resident Talks: NIH Stroke Scale and Screening Neurologic Exam, BAT Calls, Work-up of Acute Stroke  
Emergency Department Stroke Education Talks: Basic Work-up of Ischemic Stroke, Acute Stroke Assessment, The NIHSS, An Intra-arterial Success Story, IV tPA Morbidity and Mortality Case

#### Media Releases or Interviews [MR]

1. Good Housekeeping: It Started as a Headache; Rebecca Webber; 2014  
<http://www.goodhousekeeping.com/health/a25636/headache-stroke/>
2. NeuroNow: Keeping previous stroke patients from becoming inpatients; 2015  
<http://m.hopkinsmedicine.org/news/articles/keeping-previous-stroke-patients-from-becoming-inpatients>
3. Reuters Health News: Seizures After Stroke; Lorraine Janeczko; 2016
4. ACP Hospitalist: Putting Stroke Research into Practice- now that endovascular therapy has been officially endorsed by experts, how should hospitals respond?; Janet Colwell; 2016

#### Other Media [OM] (Videos, Websites, Blogs, Social Media, etc.)

1. The NIH Stroke Scale. World Neurology Foundation. 2015  
[https://www.youtube.com/watch?v=do2CbY\\_Nm5c](https://www.youtube.com/watch?v=do2CbY_Nm5c) (50 views)
2. BATs: Assessment of Acute Stroke. World Neurology Foundation. 2015  
<https://www.youtube.com/watch?v=kuwMFyENfH4> (12 views)

## FUNDING

### EXTRAMURAL Funding

#### Research Extramural Funding

##### Current:

- 10/01/12- 08/31/16 ARIC Neurocognitive Study (ARIC-NCS)  
R01 HL096812-01  
NIH/NHLBI  
PI: Coresh, J  
Role: Co-Investigator, 10%  
The goals of this study are to determine the vascular contributors to dementia and cognitive impairment in a biethnic cohort, and to determine genetic contributors to vascular cognitive impairment, dementia, and white matter disease of the brain.
- 02/15/13- 01/05/20 Medtronic SURTAVI: Surgical Replacement and Transcatheter Aortic Valve Implantation  
Medtronic  
PI: Resar, J; Conte, J  
Role: Site Neurologist, 8%  
The goals of this study are to investigate the safety and efficacy of transcatheter aortic valve implantation (TAVI) in patients with severe, symptomatic Aortic Stenosis (AS) at intermediate surgical risk by randomizing patients to either Surgical Aortic Valve Replacement (SAVR) or TAVI with the Medtronic CoreValve® System.
- 01/01/14- 03/31/16 SURPASS  
Stryker  
PI: Coon, A  
Role: Site Neurologist, 4%  
This study evaluates the Surpass Aneurysm-Embolization System for the treatment of intracranial aneurysms.
- 01/01/15- 09/21/17 WEB-IT  
Sequent Medical  
PI: Coon, A  
Role: Site Neurologist, 2%  
This study evaluates the WEB Intracranial Aneurysm Embolization System for the treatment of intracranial aneurysms.
- Pending: None.
- Previous:
- 06/01/04- 08/30/04 Egocentric and Allocentric Visuospatial and Tactile Neglect in Stroke Patients  
AHA Student Scholarship in CV Disease and Stroke  
American Heart Association  
\$2,000  
PI: Marsh, EB, 100%
- 09/15/08- 11/30/11 Interventional Management of Stroke III (IMS III)  
5 U01 NS 052220-03  
NINDS  
\$73,272.00  
PI: Broderick, J  
Role: Co-Investigator, no salary support
- 01/01/10- 06/30/14 Efficacy and Safety Study of Desmoteplase to Treat Acute Ischemic Stroke  
NCT00856661

H. Lundbeck A/S  
\$75,397.00  
PI: Albers, G  
Role: Co-Investigator, no salary support

07/01/10- 09/30/12 Too Thin or Not Too Thin; A Predictive Model of the Risks and Benefits of Anticoagulation in Patients Presenting with Acute Ischemic Stroke  
R25 NS065729  
NIH/NINDS  
\$359,546  
PI: Hillis, AE  
Role: PI of Administrative Supplement: Marsh, EB, 80%  
Principal Investigator of Administrative Supplement, 80% for 9 calendar mo/yr  
The major goal of this study is determine the factors that predict increased risk of intracranial hemorrhage within 2 unique populations: an inpatient cohort with acute ischemic stroke and an indication for anticoagulation, and a community-based cohort (through the Atherosclerosis Risk in Communities (ARIC) Study).

08/01/10- Platelet Oriented Inhibition in New TIA and Minor Ischemic Stroke Trial  
NCT00991029  
NINDS/NETT  
\$22,222.00  
PI: Johnston, C  
Role: Co-Investigator, no salary support

10/01/12- 06/30/14 Neural Bases of Empathy and Prosody  
5R01NS047691  
NIH/NINDS  
\$1,674,518.00  
PI: Hillis, AE  
Role: Co-Investigator, 9%  
The goals of this study are to use diffusion and perfusion imaging techniques to determine the areas of the brain responsible for various cognitive functions including empathy and prosody.

10/01/12- 09/30/14\* Predicting Intracranial Hemorrhage: The Multivariable Hemorrhage Risk Model  
\*with competitive renewal  
Clinician Scientist Award  
The Johns Hopkins University School of Medicine  
\$80,000  
PI: Marsh, EB, 48%  
The major goal of this study is to determine what factors are associated with increased risk of intracranial bleeding in patients presenting with acute ischemic stroke and an indication for anticoagulation.

01/01/14- 12/31/14 FRED  
Microvention  
PI: Coon, A  
Site Neurologist, 2%  
This study evaluates the FRED Stent System for the treatment of intracranial aneurysms.

### **INTRAMURAL Funding**

None.

### **CLINICAL ACTIVITIES**

#### **Clinical Focus**

I took over as Director of the Stroke Program at Bayview Medical Center in 2014. Since that time I have created a follow-up clinic (BaSIC), dedicated to the specialty care of complex stroke patients and their families post-hospital discharge, and moved the Center toward certification as a Joint Commission Comprehensive Stroke Center (one of only 3 in Maryland;

planned for July 2016). In BaSIC, we focus on under-appreciated post-stroke deficits such as fatigue, depression, and cognitive impairment that significantly impact quality of life and recovery, as well as secondary stroke prevention. By implementing BaSIC I increased the post-discharge follow-up rate from 50% to 80% and reduced readmissions.

#### Certification

None.

#### Medical, other state/government licensure

2011 Maryland Medical License, D72024

#### Boards, other specialty certification

2011 American Board of Psychiatry and Neurology

2012 Vascular Neurology

#### Clinical (Service) Responsibilities (approximately 40% effort)

2012-present Cerebrovascular Attending, Inpatient Stroke Service/Neurology Service, Johns Hopkins Hospital/Bayview Medical Center, 10 weeks/year

2012-present Outpatient Cerebrovascular Clinic, BaSIC/Intracerebral Hemorrhage Center/, Johns Hopkins Bayview Medical Center, Baltimore, MD, 2- ½ days/week

2012-present Teaching Attending, Neurology Resident Clinic, Johns Hopkins Bayview Medical Center, Baltimore, MD, 1 clinic/month

2015-present Unified BAT Attending (covering acute stroke call for Johns Hopkins Hospital, Bayview Medical Center, Howard County General), 12 weeks/year

#### Clinical Productivity

All patients admitted to Bayview Medical Center with stroke (>450 per year) are seen by the stroke team in the hospital (comprised of myself, Rafael Llinas MD, and Erin Lawrence- stroke coordinator). The Bayview Stroke Intervention Clinic sees approximately 150 of these patients per year and patients are followed at 1, 6, and 12 months post-stroke. In addition, I see patients from Maryland, out-of-state, and international patients for second opinions and stroke management in my own weekly clinic.

FY 2015 Out of state/international percentage: 14%

FY 2015 Percent utilization: 133% (2,345 RVUs; 139% of target)

#### Clinical Draw from outside local/regional area

As BaSIC and my stroke practice focus mainly on stroke recovery and draw from my patient base treated at Bayview's Stroke Center, the majority of my patient population is local, as acute stroke treatment is time dependent. As a Stroke Center specializing in acute treatment using both IV tissue plasminogen activator (over 40 cases per year) and endovascular clot removal (over 20 cases per year), we are best able to treat complex stroke patients with large vessel occlusions and severe strokes based on the new stroke trials recently published in the NEJM. As one of 3 centers within the state of Maryland capable of such treatment, beginning in July 2016 these patients will now be preferentially routed from around the state and regional areas (PA, DC, VA, DE, etc) for acute treatment and followed in our clinic.

#### Membership in or examiner for specialty board

2012-present American Board of Psychiatry and Neurology Vascular Neurology

#### Clinical Program Building / Leadership

2012-present Co-Director, Johns Hopkins Intracerebral Hemorrhage Center, Bayview Medical Center

2013-present Co-Director, Johns Hopkins Bayview Stroke Intervention Clinic (BaSIC), Bayview Medical Center

2014-present Director, Stroke Center, Johns Hopkins Bayview Medical Center, Baltimore, MD- soon to be one of 3 Comprehensive Stroke Centers Bayview is a leader in the Stroke Clinical Community in the state helping to create policy to ensure optimal care of all stroke patients state-wide

#### Clinical Demonstration Activities to external audience, on or off campus

None.

#### Development of nationally/internationally recognized clinical standard of care

03/2015 Presentation on Acute Stroke Treatment, Clinical Management, and Rehabilitation as part of the International Symposium for the Frontiers of Medicine, Hospital Moinhos de Ventos, Porto Alegre Brazil

05/2016 Presentation to Chilean government on Creating a Successful Center of Excellence, Clinica Las Condes, Chile

## EDUCATIONAL ACTIVITIES

### Educational Focus

As Associate Program Director of the Neurology Residency I have helped to revamp the curriculum by focusing first on building a strong foundation in clinical neurology using examination, localization, and differential diagnosis; followed by individualized career paths that will hone skills needed to become successful fellows and junior faculty members: Master Clinician, Clinician-Scientist (Clinical and Basic Science), Clinician-Educator. Each path has an individualized curriculum with objectives geared toward building on previously acquired skills. Some key additions to the program include: an ambulatory neurology didactic block with clinical rotation built into junior year and an Acute Neurology Resident in the Emergency Department to focus on the identification and management of neurological emergencies. In addition, we instituted early and proactive feedback and remediation where real time verbal feedback is obtained from faculty members and fed back to residents to improve skills and promote growth and independence.

### Teaching

#### Classroom instruction (given several times throughout the year)

- 2010-present Speaker, Medical Student Lecture Series, Acute Neurologic Syndromes, Johns Hopkins University, Baltimore, MD
- 2011-present Speaker, Medical Student Lecture Series, Neurological Emergencies, Johns Hopkins University, Baltimore, MD
- 2012-present Speaker, Neurology Residents Noon Conference, Aphasia Syndromes, Johns Hopkins University, Baltimore, MD
- 2012-present Speaker, Neurology Residents Noon Conference, Evidence Basis Behind Acute Stroke Care, Johns Hopkins University, Baltimore, MD
- 2013-present Speaker, Neurology Residents Noon Conference, The Neurological Examination: Mental Status, Johns Hopkins University, Baltimore, MD
- 2013-present Speaker, Neurology Residents Noon Conference, The Neurological Examination: Cranial Nerves, Johns Hopkins University, Baltimore, MD
- 2013-present Speaker, Neurology Residents Noon Conference, Cerebral Dissection, Johns Hopkins University, Baltimore, MD
- 2014-present Speaker, Medical Student Lecture Series, Abnormal Neurological Examination, Johns Hopkins University, Baltimore, MD
- 2014-present Speaker, Neurology Residents Noon Conference, Stroke Work-up and Treatment, Johns Hopkins University, Baltimore, MD
- 2014-present Speaker, Neurology Residents Noon Conference, Stroke Treatment: Interpreting the Evidence, Johns Hopkins University, Baltimore, MD
- 2014-present Speaker, Medicine Residents Noon Conference, Diagnosis and Management of Stroke, Bayview Medical Center, Baltimore, MD
- 2015 Speaker, Neurology Residents Noon Conference, Intra-arterial Intervention at Johns Hopkins Bayview, Johns Hopkins University, Baltimore, MD
- 2015 Speaker, Medicine Residents Noon Conference, BATS: Assessment of Acute Stroke, Bayview Medical Center, Baltimore, MD
- 2015 Speaker, Medicine Residents Noon Conference, The Evidence Basis of Early Stroke Therapy, Bayview Medical Center, Baltimore, MD
- 2016 Neurology Review for MKSP, Bayview Medicine Residents Morning Report, Bayview Medical Center, Baltimore, MD

#### Clinical instruction (given several times throughout the year)

- 2010-present Small Group Instructor, Medical Student Clinical Skills Course, Johns Hopkins University, Baltimore, MD
- 2011-present Instructor, Neurology Residents Professors Rounds, Johns Hopkins University, Baltimore, MD

### CME instruction

#### JHMI/Regional

- 05/2014 Instructor, EMS Course, Acute Stroke Treatment: the Importance of EMS, Johns Hopkins Bayview Medical Center, Baltimore, MD

- 12/2014 Instructor, EMS Course, Acute Stroke Treatment II, Johns Hopkins Bayview Medical Center, Baltimore, MD
- 05/2015 Instructor, EMS Course, Acute Stroke Care- How Times Have Changed, Johns Hopkins Bayview Medical Center, Baltimore, MD

### Workshops /seminars

#### JHMI/Regional

- 02/2012 Instructor, Clinical Topics in Neuroscience Nursing II, Navigating Stroke Care, Johns Hopkins University, Baltimore, MD
- 10/2012 Instructor, Clinical Topics in Neuroscience Nursing II, Navigating Stroke Care, Johns Hopkins University, Baltimore, MD
- 01/2013 Instructor, Advanced Clinical Topics in Cerebrovascular Disease and Stroke (Nursing), Stroke Syndromes, Johns Hopkins University, Baltimore, MD
- 01/2013 Instructor, Nursing Education, The NIHSS, Johns Hopkins Bayview, Baltimore, MD
- 02/2013 Instructor, Nursing Education, The NIHSS, Johns Hopkins Bayview, Baltimore, MD
- 02/2013 Instructor, Advanced Clinical Topics in Cerebrovascular Disease and Stroke (Nursing), Stroke Syndromes, Johns Hopkins University, Baltimore, MD
- 04/2013 Instructor, Clinical Topics in Neuroscience Nursing II, Navigating Stroke Care, Johns Hopkins University, Baltimore, MD
- 05/2013 Instructor, Certified Stroke Registered Nursing Review Course, Mimics of Stroke and Stroke Syndromes, Johns Hopkins University, Baltimore, MD
- 11/2013 Instructor, Nurse Practitioner Curriculum, Neurologic Spells, Johns Hopkins University School of Nursing, Baltimore, MD
- 04/2015 Instructor, Nurse Practitioner Curriculum, Transient Neurologic Events, Johns Hopkins University School of Nursing, Baltimore, MD

### Mentoring

#### Pre-doctoral Advisees /Mentees

- 2013 Emma Kaplan, BS, medical student at the University of Maryland; worked with me as an undergraduate student (University of Pennsylvania); poster presentation at ANA 2014 [OR 17]
- 2014 Karen Chen, undergraduate student (Case Western University); currently working with me; poster presentation at AAN 2015 [posters 3]
- 2014 Erin Lawrence, MSN, Bayview Stroke Coordinator; worked with me as part of the stroke team on quality improvement projects to decrease door-to-needle times; poster presentation ISC 2015 [poster 1]
- 2014 Wendy Chen, Neurology Resident Baylor College of Medicine; worked with me as a medical student (Johns Hopkins University School of Medicine) to set up our current study on post-stroke cognitive decline
- 2015 Mohammed Mukarram, medical student at UCSF; worked with me for his capstone project for his MPH (Johns Hopkins Bloomberg School of Public Health); poster presentation ISC 2016 [poster 4]

#### Post-doctoral Advisees /Mentees

- 2014 Andrea Christman Schneider, Neurology Resident JHMI; worked with me as a medical student (Johns Hopkins University School of Medicine) and resident on stroke outcomes in the diabetic patient [OR 24]
- 2015 Richa Sharma, Neurology Resident JHMI; worked with me as a resident on post-stroke cognitive decline
- 2016 Martin Chacon, MD (Instituto Nacional de Nutricion y Ciencias Medicas Salvador Zubiran, Mexico City); worked with me as a post-doctoral fellow in post-stroke recovery studies

### Thesis committees

#### Training grant participation

- 2015 Reviewer, Johns Hopkins Neurology Department Internal K Review Committee
- 2015 Expert Consultant, *Analysis of Acute Inflammatory Markers in the Hematoma Fluid from Spontaneous Intracerebral and Intraventricular Hemorrhage*, Institute for Clinical and Translational Research, Johns Hopkins School of Medicine

### Educational Program Building / Leadership

- 07/11- 06/13 Fellowship Curriculum Coordinator, The Johns Hopkins Cerebrovascular Division; created a curriculum for the fellows based around pivotal stroke trials and common stroke images
- 07/13- present Co-Associate Program Director, The Johns Hopkins Neurology Residency Program; see Educational Focus [EF] for details

07/13-present Graduate Medical Education Committee  
07/13-present Residency Selection Committee  
07/14-present Creator-Clinical Research Track, The Johns Hopkins Neurology Residency Program; [EF]  
01/16-present Participant, Master Mentor Program, Johns Hopkins School of Medicine; competitively chosen course to educate those seen as master mentors within the JHMI system to subsequently program build within their department

[Educational Demonstration Activities to external audiences](#), on or off campus

None.

## RESEARCH ACTIVITIES

### Research Focus

I began my research career as an undergraduate studying language and attention deficits in patients with acute stroke. As a resident and Cerebrovascular Fellow I became particularly interested in the use of evidence-based medicine to inform clinical practice and guide decision making and was awarded an R25 Research Training Award through the NIH to investigate factors associated with increased risk of hemorrhagic transformation of acute stroke. My work resulted in the creation of the Hemorrhage Risk Stratification (HeRS) score that is available as an iPhone application. My current role as the director of the nationally-recognized stroke program at the Johns Hopkins Bayview Medical Center has provided me access to a large patient population and the resources necessary to both design and implement further studies that have already led to significant changes in our evaluation and management of stroke in both the inpatient and outpatient setting. Implementing the Bayview Stroke Intervention Clinic, where stroke patients are followed post-discharge has allowed me to follow stroke survivors over the course of their recovery, creating a unique clinical cohort of patients. Within my population, I found high rates of depression, fatigue, cognitive dysfunction, even in those with “good recoveries”. These problems result in significant functional impairment, but are not well captured by our current outcome scales. Along with other under-recognized deficits, these problems severely impact quality of life and prohibit successful reintegration into society. I have published and reported some of my preliminary findings at national meetings and an international symposium on stroke diagnosis and treatment and am in the process of applying for a K23 to study the quantification and evolution of these issues throughout recovery with the long term goal of designing targeted rehabilitation programs to improve outcomes.

### Research Program Building / Leadership

2013-present Co-Director, Johns Hopkins Bayview Stroke Intervention Clinic (BaSIC), Bayview Medical Center  
2014-present Director, Stroke Center, Bayview Medical Center

[Research Demonstration Activities](#) to external audience, on or off campus

None.

### Inventions, Patents, Copyrights

The Hemorrhage Risk Stratification (HeRS) Score iPhone application, 2014.

### Technology Transfer Activities

None.

## SYSTEM INNOVATION AND QUALITY IMPROVEMENT ACTIVITIES

### System Innovation Focus

As part of my work with the Stroke Program I have focused on quality improvement. With the help of the Stroke Team we have successfully doubled the number of patients treated with IV tPA within the targeted 60 minute door-to-needle time, increased the post discharge clinic follow-up rate from 50 to 80% and decreased our 30 day readmissions.

### System Innovation and Quality Improvement efforts within JHMI:

2012-present Member, Stroke Oversight Committee, Bayview Medical Center  
2012-present Head, Peer Review Committee for Quality Assurance, Bayview Medical Center  
2015-present Physician Champion, EPIC, Johns Hopkins Hopkins/Bayview Medical Center

### System Innovation and Quality Improvement efforts outside of JHMI:

2016 Consultant, Creating A Successful Center of Excellence, Clinica Las Condes, Chile

[System Innovation and Quality Improvement Program Building/Leadership:](#)

2014-present Director, Stroke Center, Bayview Medical Center

## **ORGANIZATIONAL ACTIVITIES** (*in chronological order, earliest first by start date under each subcategory*)

### Institutional Administrative Appointments

2009-2011 Neurology Representative, Johns Hopkins Medical School Council  
2011-2012 Organizer, Stroke Journal Club, Department of Neurology, Johns Hopkins Hospital  
2011-2012 Organizer, Cerebrovascular Fellows Lecture Series, Department of Neurology, Johns Hopkins Hospital  
2012-present Director, Johns Hopkins Intracerebral Hemorrhage Center, Bayview Medical Center  
2013-present Co-Associate Director, Neurology Residency Program  
2013-present Co-Director, Johns Hopkins Bayview Stroke Intervention Clinic (BaSIC), Bayview Medical Center  
2014-present Director, Stroke Center, Bayview Medical Center  
2014-present Joint Practice Improvement Committee, Neurosciences

### Editorial Activities

#### Editorial Board appointments

2014 Co-editor, Cerebrovascular Edition, Journal of Neurology and Translational Neuroscience (54 pages).  
2014-present Review Board, 2014, Practice Update Neurology (<http://www.practiceupdate.com>).

#### Journal peer review activities

Stroke  
PLoS ONE  
Critical Care Medicine  
Neurology  
NeuroImage  
Science Domain International  
Behavioral Neurology  
Brain and Cognition  
Journal of Neurology, Neurosurgery, and Psychiatry  
Drugs and Aging  
European Journal of Neurology  
British Medical Journal  
Journal of Sleep Medicine

#### Other peer review activities [*non medico-legal*]

None.

#### Advisory Committees, Review Groups/Study Sections

2014-present American Heart Association, Innovative Research Grant (IRG) Program  
2015 American Neurological Association, Abstract Reviewer

#### Professional Societies

2004-present Member, American Heart Association/American Stroke Association (AHA); FAHA (2016)  
2008-present Member, American Academy of Neurology (AAN)  
2013-present Member, American Neurological Association (ANA)

#### Conference Organizer

National

2015-present Task force, American Neurological Association Interactive Lunch Workshops Committee

#### Session Chair

National

2015 Moderator: Brain Injury and Neurologic Recovery. ANA Annual Conference, Chicago, IL

#### Consultantships

None.

## **RECOGNITION**

## Awards, Honors

- 2003 Magna Cum Laude, Johns Hopkins University
- 2003 The National Society of Collegiate Scholars, Member
- 2003 Phi Beta Kappa, Member
- 2007 Alpha Omega Alpha, Member
- 2008 Catch a Shining Star Award, Johns Hopkins Bayview Medical Center
- 2010 Johns Hopkins Hypnos Award in Sleep Medicine
- 2011 Guy McKhann Award for Teaching Excellence
- 2012 NIH Loan Repayment Program Award (with competitive renewal 2014)
- 2013 Osler Housestaff Teaching Award in Neurology
- 2016 Fellow of the American Heart Association (FAHA)

## Invited Talks

### JHMI/Regional

- 09/2003 Cognitive Recovery in Idiopathic Adult Hydrocephalus after Shunt. Johns Hopkins Cognitive Neurology Meeting, Baltimore, MD
- 10/2003 Dementia Characteristics and Outcomes in NPH, Foundations and Frontiers of Adult Hydrocephalus, Johns Hopkins School of Medicine, Baltimore, MD
- 11/2004 Egocentric and Allocentric Visuospatial and Tactile Neglect in Stroke Patients. Johns Hopkins Cognitive Neurology Meeting, Baltimore, MD
- 11/2005 A Patient with Optic Aphasia Reveals Neural Pathways for Oral Reading. JHU SOM Student Interest Group in Neurology Meeting, Baltimore, MD
- 06/2011 Too Thin or Not Too Thin: a predictive model of the risk of intracranial hemorrhage in patients with acute ischemic stroke and an indication for anticoagulation. Neurology Grand Rounds, Johns Hopkins Hospital, Baltimore, MD
- 03/2013 The Importance of Localization in Stroke Care. Stroke Update 2013, Johns Hopkins Bayview Medical Center, Baltimore, MD
- 04/2013 Recognizing and Treating Transient Ischemic Attack (TIA). 23rd Annual Practical Update in Outpatient Neurology, Johns Hopkins School of Medicine, Baltimore, MD
- 04/2013 Predicting Intracerebral Hemorrhage. Neurosciences Seminar Series, Johns Hopkins School of Medicine, Baltimore, MD
- 11/2013 Transient Ischemic Attacks. Medical Grand Rounds, Shady Grove Adventist Hospital, Rockville, MD
- 03/2014 The New Oral Anticoagulants in Acute Ischemic Stroke. 24th Annual Practice Update in Outpatient Neurology, Johns Hopkins School of Medicine, Baltimore, MD
- 04/2014 The New Oral Anticoagulants. Stroke Update 2014, Johns Hopkins Bayview Medical Center, Baltimore, MD
- 04/2014 Stroke Syndromes and Mimics. Stroke Update 2014, Johns Hopkins Bayview Medical Center, Baltimore, MD
- 11/2014 The Bayview Stroke Program: Building Inside and Out...patient. Inch by Inch Stroke Survivor Support Group. Bayview Medical Center, Baltimore, MD
- 02/2015 Treatment of Acute Ischemic Stroke: Basic Principles... with a Twist, Grand Rounds, University of Maryland Midtown Campus, Baltimore, MD
- 02/2015 Work-up and Management of TIA in an 88 Year Old, 42nd Annual Current Topics in Geriatrics, Johns Hopkins Hospital, Baltimore, MD
- 05/2015 Vascular Dementia, Geriatrics Fellows Lecture Series, Bayview Medical Center, Baltimore, MD
- 05/2015 Tumulty Topics in Clinical Medicine: New Oral Anticoagulants, Johns Hopkins Hospital, Baltimore, MD
- 09/2015 Stroke Work-up and Management: From Admission through Recovery, Grand Rounds, Good Samaritan Hospital, Baltimore, MD
- 09/2015 When a "Good Outcome" is Not Ok: under-recognized deficits of post-stroke recovery, Neurology Grand Rounds, Johns Hopkins Hospital, Baltimore, MD
- 10/2015 Re-Defining "Good Outcomes" Post-Stroke, Grand Rounds, Welch Center for Prevention, Epidemiology, and Clinical Research, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD
- 11/2015 Underlying Pathways of Aphasia. Neuroscience Course, Johns Hopkins University Undergraduate Campus, Baltimore, MD
- 01/2016 Restarting Anticoagulation Post- Stroke and the New Oral Anticoagulants, Grand Rounds, Union Memorial Hospital, Baltimore, MD

- 01/2016 Defining a Good Recovery. Neurology Faculty Meeting, Johns Hopkins Bayview Medical Center, Baltimore, MD
- 03/2016 Using New Oral Anticoagulants for Atrial Fibrillation After Stroke, Grand Rounds, Harbor Hospital, Baltimore, MD
- 03/2016 Acute Stroke Treatment: IV tPA, 7th Neurocritical Care for the General and Surgical Intensivist, Johns Hopkins School of Medicine, Baltimore, MD
- National
- 06/2011 The R-25; a Resident's Perspective. NINDS/AUPN/ANA Combining Clinical and Research Careers in Neuroscience Symposium, Washington DC
- 09/2011 Renal failure increases risk for intracranial hemorrhage following stroke. Special Interest Group, Cerebrovascular Diseases, Data Blitz; American Neurological Association Annual Meeting, San Diego, CA
- 05/2013 Diagnosing CNS Vasculitis, the case against empiric treatment. Neurovascular Grand Rounds, Christiana Hospital, Newark DE
- 10/2015 Hemorrhagic Transformation: How to Predict Intracranial Bleeding. Neurology Grand Rounds, University of Chicago Medical Center, Chicago, IL
- 10/2015 Key Note Speaker- Antithrombotic Therapy After Hemorrhagic Stroke. 4th Annual Intermountain S Stroke Conference, Salt Lake City, UT
- 11/2015 Stroke and Recovery in Women. 4th Annual Stroke Update Conference. University of Toledo, Perrysburg, OH
- 12/2015 A Good Recovery? Under-Recognized Deficits Significantly Impact Quality of Life Post-Stroke. Neurology Grand Rounds, Dartmouth Medical Center, Hanover, NH
- 01/2016 A Good Recovery? Under-Recognized Deficits Significantly Impact Quality of Life Post-Stroke. Neurology Grand Rounds, Hahneman Hospital, Drexel University, Philadelphia, PA
- 02/2016 Stroke Work-up and Recovery, Medicine Grand Rounds, Virginia Hospital Center, Arlington, VA
- 03/2016 Intracranial Atherosclerosis. Neurology Fellows Grand Rounds, National Institutes of Health, Bethesda, MD
- International
- 03/2015 Diagnosis, Treatment, and Rehabilitation of Acute Stroke: the Experience at Johns Hopkins Hospital. 2015 International Symposium for the Frontiers of Medicine; Hospital Moinhos de Vento, Porto Alegre Brazil
- 03/2015 The New Oral Anticoagulants: an Overview of their Use. 2015 International Symposium for the Frontiers of Medicine; Hospital Moinhos de Vento, Porto Alegre Brazil
- 03/2015 Vascular Dementia: the Differential and Diagnostic Work-up. 2015 International Symposium for the Frontiers of Medicine; Hospital Moinhos de Vento, Porto Alegre Brazil
- 03/2015 Vascular Dementia: Treatment. 2015 International Symposium for the Frontiers of Medicine; Hospital Moinhos de Vento, Porto Alegre Brazil
- 03/2015 The Link Between Migraine and Ischemic Stroke. 2015 International Symposium for the Frontiers of Medicine; Hospital Moinhos de Vento, Porto Alegre Brazil
- 2015 The NIH Stroke Scale. World Neurology Foundation
- 2015 BATs: Assessment of Acute Stroke. World Neurology Foundation
- 2015 Basic Work-up of Ischemic Stroke Work-up. World Neurology Foundation
- 03/2016 Vascular Cognitive Decline Before and After Stroke. Video conference address; Neurology Meeting of Hospital Moinhos de Vento, Porto Alegre Brazil

## OTHER PROFESSIONAL ACCOMPLISHMENTS

Posters (only those not yet published, with manuscripts in preparation) (\*corresponding author)

1. \*[Lawrence E](#), Merbach D, Thorpe S, Llinas RH, **Marsh EB**. Time is of the essence: a nurse-based intervention to improve door-to-needle times. 2015; The International Stroke Conference annual meeting (Nashville, TN). [SI]
2. \*Maygers J, [Lawrence E](#), Llinas RH, **Marsh EB**. Transitions of care: increasing follow-up and decreasing readmission rates after hospitalization for acute ischemic stroke. 2015; The International Stroke Conference annual meeting (Nashville, TN). [SI]
3. \*[Chen K](#), Schneider AC, Marsh EB. CTA helps predict ischemic stroke in dizzy patients, but NOT better than the clinical examination. 2015; The American Academy of Neurology annual meeting (Washington DC). [SI]

4. **\*Marsh EB**, Lawrence E, Llinas R. The NIH stroke scale can miss improvement after IV tPA for acute ischemic stroke. 2015; The American Heart Association's Quality of Care and Outcomes Research scientific session (Baltimore, MD). [QI]
5. **\*Mukarram F**, Gottesman RF, **Marsh EB**. Glucose on admission associated with post-stroke outcome. 2016; The International Stroke Conference annual meeting (Los Angeles, CA).