

JENNIFER K. LEE
The Johns Hopkins University School of Medicine

Date January 16, 2019

DEMOGRAPHIC AND PERSONAL INFORMATION

Current Appointments

University

2015–present Associate Professor, Department of Anesthesiology and Critical Care Medicine, Division of Pediatric Anesthesia and Critical Care Medicine, Department of Pediatrics, Johns Hopkins University School of Medicine

Other

Oct. 2016–present Board of Directors, Society for Pediatric Anesthesia

May 2018–present Founder, Women’s Empowerment and Leadership Initiative (WELI) within the Society for Pediatric Anesthesia

Personal Data

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Education and Training

Undergraduate

1994–1998 B.A.; Environmental, Population, and Organismic Biology (major); Biochemistry (minor), University of Colorado – Boulder

Doctoral/graduate

1998–2002 M.D., Johns Hopkins University School of Medicine

Postdoctoral

2002–2003 Internship, Pediatrics, Johns Hopkins University
2003–2005 Residency, Pediatrics, Johns Hopkins University
2005–2007 Residency, Anesthesiology, Johns Hopkins University
2007–2009 Fellowship, Pediatric Anesthesiology, Johns Hopkins University
2007–2009 Fellowship, Pediatric Critical Care Medicine, Johns Hopkins University

Professional Experience

2010–2015 Assistant Professor; Johns Hopkins University Dept. of Anesthesiology and Critical Care Medicine, Division of Pediatric Anesthesia and Critical Care Medicine

2015–present Associate Professor; Johns Hopkins University Dept. of Anesthesiology and Critical Care Medicine, Division of Pediatric Anesthesia and Critical Care Medicine

PUBLICATIONS

Original Research [OR] (*corresponding author; __mentees)

1. Norris DO, Donahue S, Doros RM, **Lee JK**, Maldonado TA, Ruth T, Woodling JD. Impaired adrenocortical response to stress by Brown Trout, *Salmo trutta*, living in metal-contaminated waters of the Eagle River, Colorado. *Gen Comp Endocrinol* 1999; 113(1): 1-8.
2. **Lee JK**, Jennings JM, Ellen JM. Discordant sexual partners: a study of high-risk adolescents in San Francisco. *Sex Transm Dis* 2003; 30(3): 234-240.
3. Brady KM, **Lee JK**, Kibler KK, Smielewski P, Czosnyka M, Easley RB, Koehler RC, Shaffner DH. Continuous time-domain analysis of cerebrovascular autoregulatory vasoreactivity using near-infrared spectroscopy. *Stroke* 2007; 38(10): 2818-2825.
4. Schwarz KB, Garret B, **Lee JK**, Thompson D, Thiel TK, Alter M, Strathdee S. Positive impact of a shelter-based program on hepatitis B vaccine coverage in homeless children and adolescents in Baltimore: results of a randomized, controlled trial. *J Urban Health* 2008; 85(2): 228-238.
5. Brady KM, **Lee JK**, Kibler KK, Easley RB, Koehler RC, Shaffner DH. Continuous measurement of autoregulation by spontaneous fluctuations in cerebral perfusion pressure: comparison of 3 methods. *Stroke* 2008; 39(9): 2531-2537.
6. Brady KM, Shaffner DH, **Lee JK**, Easley RB, Smielewski P, Czosnyka M, Jallo GI, Guerguerian AM. Continuous monitoring of cerebrovascular pressure reactivity after traumatic brain injury in children. *Pediatrics* 2009; 124(6): e1205-1212.
7. Brady KM, **Lee JK**, Kibler KK, Easley RB, Koehler RC, Czosnyka M, Smielewski P, Shaffner DH. The lower limit of cerebral blood flow autoregulation is increased with elevated intracranial pressure. *Anesth Analg* 2009; 108(4): 1278-1283.
8. ***Lee JK**, Kibler KK, Benni PB, Easley RB, Czosnyka M, Smielewski P, Koehler RC, Shaffner DH, Brady KM. Cerebrovascular reactivity measured by near-infrared spectroscopy. *Stroke* 2009; 40(5): 1820-1826.
Google Scholar: 106 citations as of September 2018
9. Brady KM, Mytar JO, Kibler KK, Hogue CW, **Lee JK**, Czosnyka M, Smielewski P, Easley RB. Noninvasive autoregulation monitoring with and without intracranial pressure in the naïve piglet brain. *Anesth Analg* 2010; 111(1): 191-195.
10. Joshi B, Brady K, **Lee J**, Easley B, Panigrahi R, Smielewski P, Czosnyka M, Hogue CW. Impaired autoregulation of cerebral blood flow during rewarming from hypothermic cardiopulmonary bypass and its potential association with stroke. *Anesth Analg* 2010; 110(2): 321-328.
11. Brady KM, Mytar JO, **Lee JK**, Cameron DE, Vricella LA, Thompson WR, Hogue CW, Easley RB. Monitoring cerebral blood flow pressure autoregulation in pediatric patients during cardiac surgery. *Stroke* 2010; 41(9): 1957-1962.
12. ***Lee JK**, Brady KM, Mytar JO, Kibler KK, Carter EL, Hirsch KG, Hogue CW, Easley RB, Jordan LC, Smielewski P, Czosnyka M, Shaffner DH, Koehler RC. Cerebral blood flow and cerebrovascular autoregulation in a swine model of pediatric cardiac arrest and hypothermia. *Crit Care Med* 2011; 39(10): 2337-2345.
-An editorial was written highlighting this manuscript: Manole MD, Kochanek PM, Clark RS. Lost in translation? Noninvasive cerebral monitoring after cardiac arrest. *Crit Care Med* 2011; 39(10): 2379-80.
13. ***Lee JK**, Yang ZJ, Bing W, Larson AC, Jamrogowicz JL, Kulikowicz E, Kibler KK, Mytar JO, Carter EL, Burman HT, Brady KM, Smielewski P, Czosnyka M, Koehler RC, Shaffner DH. Noninvasive autoregulation monitoring in a swine model of pediatric cardiac arrest. *Anesth Analg* 2012; 114(4): 825-836.
14. Kim JJ, Buchbinder N, Ammanuel S, Kim R, Moore E, O'Donnell N, **Lee JK**, Kulikowicz E, Acharya S, Allen RH, Lee R, Johnston MV. Cost-effective therapeutic hypothermia treatment device for hypoxic ischemic encephalopathy. *Med Devices* 2013; 6: 1-10.
15. ***Lee JK**, Williams M, Jennings JM, Jamrogowicz JL, Larson AC, Jordan LC, Heitmiller ES, Hogue CW, Ahn ES. Cerebrovascular autoregulation in pediatric moyamoya disease. *Paediatr Anaesth* 2013; 23(6): 547-556.
16. Howlett JA, Northington FJ, Gilmore MM, Tekes A, Huisman TAGM, Parkinson C, Chung SE, Jennings JM, Jamrogowicz JJ, Larson AC, Lehmann CU, Jackson E, Brady KM, Koehler RC, **Lee JK**. Cerebrovascular autoregulation and neurologic injury in neonatal hypoxic-ischemic encephalopathy. *Pediatr Res* 2013; 74: 525-535.

17. Ono M, Brown C, **Lee JK**, Gottesman RF, Kraut M, Black J, Shah A, Cameron DE, Baumgartner W, Hogue CW. Cerebral blood flow autoregulation is preserved after hypothermic circulatory arrest. *Ann Thorac Surg* 2013; 96(6): 2045-2053.
18. Larson AC, Jamrogowicz JL, Kulikowicz E, Wang B, Yang ZJ, Shaffner DH, Koehler RC, ***Lee JK**. Cerebrovascular autoregulation after rewarming from hypothermia in a neonatal swine model of asphyxic brain injury. *J Appl Physiol* 2013; 115(10): 1433-1442.
19. Hamrick JL, Hamrick JT, **Lee JK**, Lee BH, Koehler RC, Shaffner DH. Efficacy of chest compressions directed by end-tidal CO2 feedback in a pediatric resuscitation model of basic life support. *J Am Heart Assoc* 2014; 3(2): e000450.
20. ***Lee JK**, Brady KM, Chung SE, Jennings JM, Whitaker EE, Aganga D, Easley RB, Heitmiller K, Jamrogowicz JL, Larson AC, Lee JH, Jordan LC, Hogue CW, Lehmann CU, Bembea MM, Hunt EA, Koehler RC, Shaffner DH. A pilot study of cerebrovascular reactivity autoregulation after pediatric cardiac arrest. *Resuscitation* 2014; 85(10): 1387-93.
21. Wang B, Armstrong JS, Lee JH, Bhalala U, Kulikowicz E, Zhang E, Reyes M, Moy N, Spicer D, Zhu J, Yang ZJ, Koehler RC, Martin LJ, ***Lee JK**. Rewarming from therapeutic hypothermia induces cortical neuron apoptosis in a swine model of neonatal hypoxic-ischemic encephalopathy. *Journal of Cerebral Blood Flow and Metabolism* 2015; 35(5): 781-93.
22. Tekes A, Poretti A, Scheurkogel MM, Huisman TAGM, Howlett JA, Alqahtani E, Lee JH, Parkinson C, Shapiro K, Chung SE, Jennings JM, Gilmore MM, Hogue CW, Martin LJ, Koehler RC, Northington FJ, ***Lee JK**. Apparent Diffusion Coefficient Scalars Correlate with Near Infrared Spectroscopy Markers of Cerebrovascular Autoregulation in Neonates Cooled for Perinatal Hypoxic Ischemic Injury. *Am J Neuroradiol* 2015; 36(1):188-93.
23. Hori D, Everett A, **Lee JK**, Ono M, Brown C, Shah A, Conte J, Mandel K, Scortino C, Price J, Lester L, Adachi H, Cameron DE, Hogue CW. Rewarming rate during cardiopulmonary bypass is associated with release of glial fibrillary acid protein. *Ann Thorac Surg* 2015; 100(4):1353-8.
24. Burton VJ, Gerner G, Cristofalo E, Chung SE, Jennings JM, Parkinson C, Koehler RC, Valdez RC, Johnston MV, Northington FJ, ***Lee JK**. A pilot cohort study of cerebral autoregulation and 2-year neurodevelopmental outcomes in neonates with hypoxic-ischemic encephalopathy who received therapeutic hypothermia. *BMC Neurology* 2015; 15:209–22.
An editorial was written highlighting this manuscript: Pardo AC. Autoregulation in infants with neonatal encephalopathy. *Pediatr Neurol Briefs* 2015; 29(10):75.
25. Wang B, Armstrong JS, Reyes M, Kulikowicz E, Lee JH, Spicer D, Bhalala U, Yang ZJ, Koehler RC, Martin LJ, ***Lee JK**. White matter apoptosis is increased by delayed hypothermia and rewarming in a neonatal piglet model of hypoxic ischemic encephalopathy. *Neuroscience* 2016; 316:296-310.
26. ***Lee JK**, Wang B, Reyes M, Armstrong JS, Kulikowicz E, Santos PT, Lee JH, Koehler RC, Martin LJ. Hypothermia and rewarming activate and macroglial unfolded protein response independent of hypoxic-ischemic brain injury in neonatal piglets. *Dev Neurosci* 2016; 38:277-294.
27. ***Lee JK**, Poretti A, Perin J, Huisman TAGM, Parkinson C, Chavez-Valdez R, O'Connor M, Reyes M, Armstrong J, Jennings JM, Gilmore MM, Koehler RC, Northington FJ, Tekes A. Optimizing cerebral autoregulation may decrease neonatal regional hypoxic-ischemic brain injury. *Dev Neurosci* 2017; 39:248-256.
28. Chavez-Valdez R, O'Connor M, Perin J, Reyes M, Armstrong J, Parkinson C, Gilmore M, Jennings J, Northington FJ, **Lee JK**. Sex-specific associations between cerebrovascular blood pressure autoregulation and cardiopulmonary injury in neonatal encephalopathy and therapeutic hypothermia. *Pediatr Res* 2017; 81:759-766.
29. ***Lee JK**, Perin J, Parkinson C, O'Connor M, Gilmore MM, Reyes M, Armstrong J, Jennings J, Northington FJ, Chavez-Valdez R. Relationships between cerebral autoregulation and markers of kidney and liver injury in neonatal encephalopathy and therapeutic hypothermia. *J Perinatol* 2017; 37:938-942.
30. Hamrick JT, Hamrick JL, Bhalala U, Armstrong JS, Lee JH, Kulikowicz E, **Lee JK**, Kudchadkar SR, Koehler RC, Hunt EA, Shaffner DH. End-tidal carbon dioxide-guided chest compression delivery improves survival in a neonatal asphyxia cardiac arrest model. *Pediatric Critical Care Medicine* 2017; 18: e575-584.
An editorial was written highlighting this manuscript: Morgan RW, Sutton RM, Berg RA. The future of resuscitation: personalized physiology-guided cardiopulmonary resuscitation. *Pediatric Critical Care Medicine* 2017; 18:1084-1086.

31. Easley RB, Marino BS, Jennings J, Cassedy AE, Kibler KK, Brady KM, Andropoulos DB, Brunetti M, Hogue CW, Heitmiller ES, **Lee JK**, Spaeth J, Everett AD. Impaired cerebral autoregulation and elevation in plasma glial fibrillary acidic protein level during cardiopulmonary bypass surgery for CHD. *Cardiol Young* 2018; 28:55-65.
32. ***Lee JK**, Williams M, Reyes M, Ahn ES. Cerebrovascular blood pressure autoregulation monitoring and postoperative transient ischemic attack in pediatric moyamoya vasculopathy. *Paediatr Anaesth* 2018; 28: 94-102.
33. Carrasco M, Perin J, Jennings JM, Parkinson C, Gilmore MM, Chavez-Valdez R, Massaro AN, Koehler RC, Northington FJ, Tekes A, **Lee JK**. Cerebral autoregulation and conventional and diffusion tensor imaging MRI in neonatal hypoxic-ischemic encephalopathy. *Pediatric Neurology* 2018; 82: 36-43.
34. *Chen MW, Reyes M, Kulikowicz E, Hackam DJ, Koehler RC, **Lee JK**. Abdominal Near-Infrared Spectroscopy in a Piglet Model of Gastrointestinal Hypoxia Produced by Graded Hypoxia or Superior Mesenteric Artery Ligation. *Pediatric Research* 2018; 83: 1172-1181.
35. Zeiler FA, Donnelly J, Calviello L, **Lee JK**, Smielewski P, Brady K, Kim DJ, Czosnyka M. Validation of pressure reactivity and pulse amplitude indices against the lower limit of autoregulation, Part I: experimental intracranial hypertension. *J Neurotrauma*. 2018; 35 :2803-2811.
36. Zeiler FA, **Lee JK**, Smielewski P, Czosnyka M, Brady K. Validation of ICP derived cerebrovascular reactivity indices against the lower limit of autoregulation, Part II: experimental model of arterial hypotension. *J Neurotrauma* 2018; 35:2812-2819.
37. Santos PT, O'Brien CE, Chen MW, Hopkins CD, Adams S, Kulikowicz E, Singh R, Koehler RC, Martin LJ, ***Lee JK**. Proteasome biology is compromised in white matter after asphyxic cardiac arrest in neonatal piglets. *J Am Heart Assoc* 2018; 7: e009415.
38. O'Brien CE, Reyes M, Santos PT, Heitmiller SE, Kulikowicz E, Kudchadkar SR, **Lee JK**, Hunt EA, Koehler RC, Shaffner DH. Pilot study to compare the use of end-tidal carbon dioxide-guided and diastolic blood pressure-guided chest compression delivery in a swine model of neonatal asphyxial cardiac arrest. *J Am Heart Assoc* 2018; 7:e009728.
39. O'Brien CE, Santos PT, Kulikowicz E, Reyes M, Koehler RC, Martin LJ, **Lee JK**. Hypoxia-ischemia and hypothermia independently and interactively affect neuronal pathology in neonatal piglets with short-term recovery. *Develop Neurosci* 2019; In Press.

Review Articles [RA] (*corresponding author)

1. ***Lee JK**. In brief: newborn resuscitation. *Pediatr Rev* 2006; 27: e52-3.
2. **Lee JK**, Easley RB, Brady KM. Neurocognitive monitoring and care during pediatric cardiopulmonary bypass - current and future directions. *Curr Cardiol Rev* 2008; 4(2): 123-139.
3. Williams M, **Lee JK***. Intraoperative blood pressure and cerebral perfusion: strategies to clarify hemodynamic goals. *Pediatr Anesth* 2014; 24(7): 657-67.
**This manuscript was selected by editors as one of the best articles in 2014 at the American Society of Anesthesiology. It was used as an example of excellent writing and relevant material.
4. ***Lee JK**, Brady KM, Deutsch N. The anesthesiologist's role in treating abusive head trauma. *Anesth Analg* 2016. 2016;122(6):1971-82.
5. Rhee CJ, da Costa CS, Austin T, Brady KM, Czosnyka, **Lee JK**. Cerebrovascular pressure autoregulation in neonates. *Pediatric Res* 2018; in press.
6. Koehler RC, Yang Z, **Lee JK**, Martin LJ. Perinatal hypoxic-ischemic brain injury in large animal models: relevance to human neonatal encephalopathy. *J Cerebral Blood Flow and Metabolism* 2018; in press.

Book Chapters, Monographs [BC] (__mentee)

1. **Lee, J**. Poisonings. In Shilkofsky N, Goldstein J, eds. *The Harriet Lane Handbook*, 17th ed. Philadelphia: Mosby, 2005: 17-71.
2. Dishon J, **Lee J**, Lockman J, Nemergut M, Williamson J. Pediatric anesthesia. In: Heitmiller ES, Schwengel DA, eds. *The Johns Hopkins Anesthesiology Handbook*. Philadelphia: Mosby Elsevier; 2009: 311-344.
3. **Lee JK**, Schwengel DA. Singin' the OSA blues (review of adenotonsillectomy). In: Gallagher CJ, Lewis MC, Schwengel DA, eds. *Core Clinical Competencies in Anesthesiology*. Cambridge: Cambridge University Press; 2010: 289-294.

4. Schwartz JM, **Lee JK**, Hamrick JT, Hamrick JL, Hunt EA, Shaffner DH. Cardiopulmonary Resuscitation. In: Davis PJ, Cladis FP, eds. *Smith's Anesthesia for Infants and Children*, 9th ed. Philadelphia, PA: Elsevier; 2017.
5. **Lee JK**, Brady KM. Chapter 2: Developmental cerebrovascular physiology. In: Soriano S, McClain C, eds. *Essentials of Pediatric Neuroanesthesia*. Cambridge: Cambridge University Press; 2018: 9-14.
6. Padover A, **Lee JK**. Non-accidental trauma. In: Lalwani K, Choi E, Raman VT, and Cohen IT, eds. *Pediatric Anesthesiology: A Problem-Based Learning Approach*. New York, NY: Oxford University Press; 2018; 551-559.

Other Publications

Editorials [ED] (*corresponding author; __mentee)

1. ***Lee JK**. Cerebral perfusion pressure: how low can we go? *Pediatr Anesth* 2014; 24(7): 647-8.
This editorial was selected by editors as one of the best articles in 2014 at the American Society of Anesthesiology. It was used as an example of excellent writing.
2. ***Lee JK**, Koehler RC. Pediatric traumatic brain injury: is it time to consider gender-based treatments? *Pediatric Critical Care Medicine* 2016; 17(3): 275-6.
3. ***Lee JK**, Massaro AN, Northington FJ. The search continues: neuroprotection for all neonates with hypoxic-ischemic encephalopathy. *J Thoracic Disease* 2017; 9(10): 3553-3536.

Other Media [OM]

1. ***Lee JK**, William M. Clinical guidelines for anesthesia in moyamoya disease. German Society of Anaesthesiology and Intensive Care Medicine 2014.
http://www.orphananesthesia.eu/en/rare-diseases/published-guidelines/cat_view/61-rare-diseases/60-published-guidelines/106-moyamoya-disease.html

FUNDING

EXTRAMURAL

Current grant

- 7/1/18–6/30/23 Brain Microstructural MRI in a Piglet Model of Hypoxia-Ischemia
R01 NS107417
NIH NINDS
Principal Investigator: Jennifer Lee, M.D. (Multi-PI: Wu, Dept. of Radiology)
This project will test whether a novel diffusion-time dependent MRI using oscillating gradient spin-echo can identify cellular and subcellular injury in a piglet model of brain hypoxic-ischemic injury. The MRI measures will be compared to neuropathologic examinations that quantify cellular and subcellular organelle injury.
- 7/1/18–6/30/21 Proteasome modulation as a novel therapeutic for neonatal encephalopathy
18TPA34170077
American Heart Association Transformational Project Award
Principal Investigator: Jennifer Lee, M.D.
This project will test proteasome activation as a late therapy to reduce neurologic injury in neonatal hypoxic-ischemic encephalopathy.
- 7/1/14–6/30/19 Neuronal injury after pediatric cardiac arrest, hypothermia, and rewarming
K08 NS080984-01
NIH NINDS K08 Mentored-Clinical Scientist Development Award
Principal Investigator: Jennifer Lee, M.D.
The major goals of this project are to determine if rewarming after post-resuscitation hypothermia influences cortical neuroapoptosis, oligodendrocyte apoptosis, oxidative stress, endoplasmic reticulum stress, the inflammatory response, seizures, and early cortical injury and whether inhibiting specific caspases or the unfolded protein response alters these responses.

- 9/1/18–6/30/23 Assessment of brain oxygen consumption in neonates using MRI
1R01NS109029-01
NIH NINDS
Principal Investigator: Peiying Liu, Ph.D.
Role: Co-investigator
The primary goals of this project are to develop and validate a novel MRI technique that quantifies regional cerebral oxygen consumption in neonates with hypoxic-ischemic encephalopathy.
- 7/1/17–6/30/19 Novel measures of dysfunctional cerebrovascular autoregulation as biomarkers of brain injury in perinatal hypoxic-ischemic encephalopathy
126879
American Heart Association Grant-In-Aid
Principal Investigator: An Massaro, M.D. (Children’s National Health Systems)
Role: Co-investigator
This project investigates three mathematical algorithms to measure cerebrovascular vasoreactivity autoregulation with near infrared spectroscopy in neonates with hypoxic-ischemic encephalopathy. Enrollment is in two neonatal intensive care units (Johns Hopkins Hospital and Children’s National Health Systems [Washington, D.C.]). The goal is to develop a more accurate autoregulation algorithm to predict neurologic outcomes measured by brain MRI and serum GFAP.
- Previous**
- 7/1/05–6/30/07 Improving medical resource utilization in Haiti
901468
Dorothea Hauss Ross Foundation
Principal Investigator: Jennifer Lee, M.D.
The aim of this project was to improve the efficiency of medical resource use among poverty-stricken children in Haiti by establishing basic diagnostic laboratories.
- 7/1/07–6/30/09 Measuring cerebral autoregulation after traumatic brain injury (TBI) with NIRS
90028857
The Hartwell Foundation Biomedical Research Fellowship
Principal Investigator: Jennifer Lee, M.D.
The aims of this proposal were to develop a novel, noninvasive monitor of cerebrovascular autoregulation in a swine model and then translate this technology to monitor autoregulation in children with traumatic brain injuries in the pediatric intensive care unit.
- 7/1/09–6/30/10 Cerebrovascular autoregulation during hypothermia after cardiac arrest
90038844
The Foundation for Anesthesia Education and Research (FAER) Research Fellowship Grant (co-sponsors American Society of Critical Care Anesthesiologists and Hospira)
Principal Investigator: Jennifer Lee, M.D.
The aim of this proposal was to evaluate cerebrovascular autoregulatory function during normothermia and induced hypothermia in a swine model of cardiac arrest.
- 7/1/09–6/30/11 Defining the lower limit of cerebral autoregulation with non-invasive neuromonitoring in traumatic brain injury
2L40NS066505-03
NIH NINDS Pediatric Loan Repayment Program (LRP)
Principal Investigator: Jennifer Lee, M.D.
The aims of this proposal were to evaluate cerebral autoregulation in a swine model of pediatric, traumatic brain injury.

- 7/1/10–6/30/12 Non-Invasively monitoring cerebrovascular autoregulation after pediatric cardiac arrest
90043209
The International Anesthesia Research Society (IARS) Clinical Scholar Research Award
Principal Investigator: Jennifer Lee, M.D.
The aims of this proposal were to noninvasively monitor cerebral autoregulation using near infrared spectroscopy in children recovering from cardiac arrest in the pediatric intensive care unit and to compare autoregulatory function to neurologic outcomes.
- 2/1/11–2/28/12 The therapeutic hypothermia after pediatric cardiac arrest (THAPCA) trials
90045619
NHLBI
Principal Investigator: Frank Moler, M.D.
Role: Site Principal Investigator
I was the site Principal Investigator for the Johns Hopkins pediatric intensive care unit for the THAPCA Trials, an international multi-center study that evaluated the effects of therapeutic hypothermia on neurologic outcomes in pediatric patients resuscitated from cardiac arrest.
- 7/1/11–6/30/12 Preventing permanent brain injuries in infants with hypoxic-ischemic encephalopathy
90046600
The Thomas Wilson Sanitarium for Children Research Grant
Principal Investigator: Jennifer Lee, M.D.
The aim of this study was to correlate autoregulatory function to MRI-evidence of brain injury in neonates undergoing therapeutic hypothermia for hypoxic-ischemic encephalopathy in the neonatal intensive care unit.
- 12/15/11–12/15/12 Cerebrovascular autoregulation monitoring with cerebral oximetry
90048812
Covidien
Principal Investigator: Jennifer Lee, M.D.
The aim of this project was to monitor cerebral autoregulation with near-infrared spectroscopy in neonates with hypoxic-ischemic encephalopathy and identify those at greatest risk of permanent neurologic injury.
- 7/1/11–6/30/13 Cerebral autoregulation and pediatric cardiac arrest
2L40NS066505-03
NIH NINDS Pediatric Loan Repayment Program
Principal Investigator: Jennifer Lee, M.D.
This project was to develop a noninvasive monitor of cerebrovascular autoregulation in a swine model of pediatric hypoxic brain injury.
- 7/1/10–6/30/14 Cerebrovascular autoregulation and cortical injury after pediatric cardiac arrest and hypothermia
10SDG3540003
The American Heart Association (AHA) Scientist Development Grant
Principal Investigator: Jennifer K. Lee, M.D.
The aims of this proposal are to investigate the effects of hypoxic-ischemic brain injury and cardiac arrest on autoregulation in the acute and long-term recovery periods in neonatal swine.
- 7/1/13–6/30/14 Clonidine use in infants during therapeutic hypothermia for HIE
90055045
Thomas Wilson Foundation
Principal Investigator: Estelle Gauda, M.D.

Role: Co-investigator

The aim of this proposal is to investigate the safety profile of clonidine as a sedative for neonates with hypoxic-ischemic encephalopathy during therapeutic hypothermia in the neonatal intensive care unit.

- 8/1/14–8/1/15 Neuronal and oligodendrocyte cell death in pediatric hypoxic brain injury, therapeutic hypothermia, and rewarming
2L40NS066505-03
NIH Pediatric Research Loan Repayment Program
Principal Investigator: Jennifer Lee, M.D.
The aims of this proposal are to investigate the effects of rewarming from therapeutic hypothermia on neuronal and oligodendrocyte cell death mechanisms in neonatal swine.
- 9/1/14–8/30/16 End-tidal carbon dioxide directed neonatal cardiopulmonary resuscitation
R21HD072845
NIH NICHD
Principal Investigator: Donald H. Shaffner, M.D.
Role: Co-investigator
The aims of this proposal are to compare a novel method of cardiopulmonary resuscitation (CPR) based on end-tidal carbon dioxide monitoring to standard CPR in swine models of cardiac arrest from hypoxia-asphyxia or ventricular fibrillation.
- 5/22/15–4/30/17 Cerebral NIRS monitoring and neonatal outcomes following birth asphyxia
ISR-2014-10359
Medtronic
Principal Investigator: Jennifer Lee, M.D.
The goal of this contract proposal is to determine whether cerebrovascular blood pressure autoregulation measured by a novel index derived from near-infrared spectroscopy predicts renal, hepatic, pulmonary, and gastrointestinal comorbidities in neonates with hypoxic-ischemic encephalopathy who receive therapeutic hypothermia in the neonatal intensive care unit.
- 7/1/15 – 6/30/17 American Heart Association Grant-In-Aid
15GRNT25730001
Neuroprotection from neonatal hypoxia-ischemia by activation of the antioxidant transcription factor Nrf2
Principal Investigator: Jennifer Lee, M.D.
The aims of this proposal are to determine whether sulforaphane can prevent neuronal cell death, improve neurobehavior outcomes, and decrease oxidative stress and inflammation in a piglet model of hypoxic-ischemic brain injury.

INTRAMURAL FUNDING

Current

- 1/1/19–12/31/19 Modulating autophagy to reduce white matter injury in neonatal hypoxic-ischemic brain injury
Johns Hopkins StAAR Grant (Stimulating and Advancing ACCM Research)
Role: Principal investigator
This project will evaluate the role of autophagy in white matter injury in the piglet model of neonatal hypoxic ischemic encephalopathy and hypothermia.

Previous

- 7/1/14–6/30/16 Neuron and oligodendrocyte injury after pediatric hypoxia, hypothermia, and rewarming

Johns Hopkins University Clinician Scientist Award

Principal Investigator: Jennifer Lee, M.D.

This grant supplements the K08 Mentored-Clinical Scientist Development Award to provide salary support to the principal investigator.

- 7/1/16 – 6/30/17 Johns Hopkins StAAR Grant (Stimulating and Advancing ACCM Research)
Development of preliminary data for a protocol that guides resuscitative efforts based on physiologic feedback during cardiopulmonary resuscitation using end-tidal carbon dioxide levels
Principal Investigator: Donald Hal Shaffner, M.D.
Role: Co-Investigator
The aims of this proposal are to compare cardiopulmonary resuscitation efficacy using standard guidelines VS. end-tidal carbon dioxide target levels in piglet models of asphyxic and ventricular fibrillation cardiac arrest models.
- 8/1/16-7/31/17 Johns Hopkins StAAR Grant (Stimulating and Advancing ACCM Research)
Optoacoustic Intrapartum Fetal Brain Monitoring to Prevent Hypoxic-Ischemic Encephalopathy
Principal Investigator: Raymond C. Koehler, Ph.D.
Role: Co-Investigator
We will correlate optoacoustically measured biomarker signals with arterial blood gas measurements of hypoxia and metabolic acidosis and with histological brain injury in adult rats and neonatal piglets. Biomarkers of interest include oxygenated hemoglobin, cytochrome c oxidase, and glial fibrillary acidic protein.
- 1/1/18–12/31/18 Proteasome activation as a therapy to reduce white matter injury in neonatal hypoxic-ischemic brain injury and during therapeutic hypothermia
80045492
Johns Hopkins StAAR Grant (Stimulating and Advancing ACCM Research)
Role: Principal investigator
This project uses virus-mediated genetic modulation of the proteasome in piglets and oxygen glucose deprivation in cell culture experiments to test the role of the proteasome in white matter injury after hypoxia-ischemia.

RESEARCH ACTIVITIES

Research Focus

I study neuroprotective strategies for the treatment of neonatal and pediatric hypoxic brain injuries, including from birth asphyxia, cardiac arrest, or trauma. My areas of focus are cerebrovascular autoregulation and neural cell death mechanisms. I have had continuous extramural research funding since 2007, including from the NIH, American Heart Association, and several other foundations and industry. I developed a clinician-scientist training program for trainees interested in neuroprotection research.

PROGRAM BUILDING/LEADERSHIP

National

- 5/1/16–3/6/17 Society for Pediatric Anesthesia conference planning committee: apprentice to Committee Chair
- 10/2016–present Board of Directors, Society for Pediatric Anesthesia
- 5/2018–present: Founder of the Women’s Empowerment and Leadership Initiative (WELI) within the Society for Pediatric Anesthesia. This program is designed to increase the number of women who achieve promotion and leadership positions through a 1:1 coach:mentee nationwide networking system,

coaching workshops, and workshops designed for mentees on leadership, negotiation, etc. Dissemination of knowledge about implicit bias, diversity, etc. is also accomplished through platform sessions and panels focused on diversity at the international Society for Pediatric Anesthesia annual conferences.

10/2018–present: Society for Pediatric Anesthesia Advocacy committee. This committee is part of the Society’s 5-year strategic plan. The purpose is to increase the Society’s role in advocating for children, including topics of gun violence, separation of children from their families during the immigration process, etc.

Regional

2010–present Pediatric Neuroprotection Research Program: I created a program for medical trainees who are interested in becoming clinician-scientists in fields related to pediatric neuroprotection. I am the primary mentor for several clinician-scientists and medical trainees, including mentees from the Departments of Anesthesiology, Neonatology, Neurology, and Pediatric Critical Care as well as junior trainees ranging from high school to medical school students.

Please refer to the Mentoring section for further details.

2/2015–11/2015: **Co-leader of the Biomedical Research Investment Committee:** I helped to development of a competitive, internal funding program to provide grants for biomedical research within the Johns Hopkins Anesthesiology and Critical Care Medicine Department (StAAR program [Stimulating and Advancing Research within ACCM]). We developed a 6-tiered internal grant mechanism structure and a study section with a peer review process to review, score, and provide feedback and guidance for the grant proposals. This grant program was provided approximately \$4 million by the Johns Hopkins University Board over 5 years to fund research within my Department. I specifically guided the development of the Mentored Research Grant funding mechanism.

EDUCATION

Please refer to the Recognition section for invited lectures.

My most frequent topics for lectures are the management of pediatric brain trauma (child abuse or accidental trauma), resuscitation (e.g. from cardiac arrest or trauma), and neurosurgical emergencies. I also frequently lecture to residents about the perioperative management of asthma and respiratory infections.

Teaching

Clinical Instruction

1/1/10–present: Weekly instruction and teaching during clinical service with fellows, residents, and medical students

National Lectures

1/3/13 “Pediatric neurosurgical emergencies: traumatic brain injury”: lecturer, University of Louisville, Louisville, KY.

Regional Lectures

Didactic lectures to fellows in pediatric anesthesiology

8/18/11 “Hypothesis-driven research for physician-scientists”: lecturer, Johns Hopkins University (JHU)

9/1/11 “Neurosurgical emergencies”: lecturer, JHU

3/28/13 “Mock oral board exams”: lecturer/“junior board examiner”, JHU

2/4/16 “Mock oral board exams”: lecturer/“board examiner”, JHU

1/18/18 “Abusive Head Trauma and Child Abuse” journal club, JHU

Didactic lectures to residents in anesthesiology

- 3/28/10 “Pediatric anesthesia”: lecturer, JHU
7/29/11 “Intracranial hypertension”: lecturer, JHU
9/16/11 “Ventriculo-peritoneal shunt malfunctions”: lecturer, JHU
2/3/12 “CNS tumors”: lecturer, JHU
4/6/12 “Neurosurgical emergencies”: lecturer, JHU
5/29/12 “Asthma and upper respiratory tract infections”: lecturer, JHU
7/17/12 “More neurosurgical emergencies”: lecturer, JHU
11/30/12 “Pediatric neuroanesthesia”: lecturer, JHU
2/27/13 “Asthma and anesthesia”: lecturer, JHU
3/21/13 “Neuroanesthesia”: lecturer, JHU
7/5/13 “Upper respiratory infections and anesthesia”: lecturer, JHU
1/24/14 “Asthma exacerbations during anesthesia”: lecturer, JHU
4/11/14 “Respiratory infections and asthma”: lecturer, JHU
9/26/14 “Traumatic brain injury”: lecturer, JHU
12/22/14 “Traumatic brain injury”: lecturer, JHU
2/27/15 “Brain trauma and orthopedic emergencies”: lecturer, JHU
6/23/15 “Pediatric neurotrauma”: lecturer, JHU
12/8/15 “Pediatric traumatic brain injury guidelines”: lecturer, JHU
4/15/16 “Pediatric neurosurgery”: mentored pediatric anesthesia fellow Dr. Rajeev Wadia to deliver the lecture, JHU
7/8/16 “Pediatric traumatic brain injury”: lecturer, JHU
12/6/16 “Pediatric traumatic brain injury”: lecturer, JHU
3/31/17 “Neurosurgical emergencies”: lecturer, JHU
8/25/17 “Pediatric cardiac arrest”: lecturer, JHU
2/24/18 “Respiratory infections and asthma”: lecturer, JHU
5/17/18 “Non-accidental trauma and abusive head trauma”: lecturer, JHU
7/13/18 “Abusive head trauma and pediatric traumatic brain injury”: lecturer, JHU
11/14/18 “Neuroanesthesia”; lecturer, JHU

Didactic lectures to residents in pediatrics

- 1/24/12 “Pediatric sedation and airway management”: lecturer, Sinai Hospital, Dept. of Pediatrics

Didactic lectures to fellows in pediatric critical care medicine

- 9/29/10 “Therapeutic hypothermia and cardiac arrest”: lecturer, JHU

Lecture to pediatric perfusionists/respiratory therapists

- 7/25/11 “Therapeutic hypothermia and extracorporeal membrane oxygenation (ECMO): lecturer, JHU

MENTORING

June 2018–present Johns Hopkins University Pathobiology PhD Graduate Training Program faculty member

Research projects on which I have directed clinician-scientist trainees include:

- 8/1/10–2/1/12: Cerebrovascular autoregulation after recovery from cardiac arrest in a swine model (laboratory study). Mentee: Abby Larson, BS
9/1/11–5/30/12: Cerebrovascular autoregulation after therapeutic hypothermia and rapid rewarming in a swine model of pediatric cardiac arrest (laboratory study). Mentee: Abby Larson, BS

- 9/1/10–6/30/13: Cerebrovascular autoregulation in neonatal hypoxic-ischemic encephalopathy and neurologic injury on MRI (clinical study). Mentee: Jessica Howlett, MD
- 9/1/10–6/30/13: Cerebrovascular autoregulation in neonatal hypoxic-ischemic encephalopathy and changes on amplitude-integrated EEG (clinical study). Mentee: Jessica Howlett, MD
- 7/1/11–6/30/12: Cerebrovascular autoregulation after pediatric cardiac arrest and association with neurologic outcome (clinical study). Mentees: Devon Aganga, MD, and Emmett Whitaker, MD
- 8/1/11–3/30/12: Monitoring cerebral autoregulation non-invasively during neurosurgical revascularization for moyamoya syndrome (clinical study). Mentee: Monica Williams, MD
- 3/1/12–12/31/12: Neurotoxicity after anesthesia in a neonatal swine model (laboratory study). Mentee: Emmett Whitaker, MD
- 8/1/12–5/30/14: Cell death mechanisms in a neonatal swine model of HIE (laboratory study). Mentee: Jeong-Hoo “Eric” Lee, BS
- 9/1/13–6/30/16: Cerebrovascular autoregulation and non-neurologic organ injury in neonates with hypoxic-ischemic encephalopathy (clinical study). Mentee: Matt O’Connor, MD
- 4/15/14–12/31/16: Endoplasmic reticulum stress and cell death in a neonatal swine model of HIE (laboratory study). Mentee: Michael Reyes, BA
- 11/1/15–present: Inflammatory response to cardiac arrest and the cell death continuum in a neonatal swine model (laboratory study). Mentee: Caitlin O’Brien, MD.
NIH T32 grant
Pearl M. Stetler Research Fellowship Award
- 7/1/16–4/30/16: Near infrared spectroscopy monitoring in a piglet model of necrotizing enterocolitis (laboratory study). Mentee: May Chen, MD
- 1/1/17–present: Mitochondrial permeability transition pore inhibition after hypoxia-ischemia (laboratory study). Mentee: May Chen, MD
- 10/1/16–present: Cerebrovascular autoregulation and brain MRI in neonatal hypoxic-ischemic encephalopathy (clinical study). Mentee: Melisa Carrasco McCaul, MD
- 3/1/17–present: Optic tract pathology after whole-body ischemia, hypothermia, and rewarming (laboratory study). Mentee: Panagiotis Kratimenos, M.D.
- 3/1/17–present: Autophagy and a preclinical model of hypoxic-ischemic encephalopathy (laboratory study). Mentee: Melisa Carrasco McCaul, MD.
NIH R25 grant

Advisees

- 8/1/10–6/30/13 Devon Aganga, MD (Anesthesiology resident; fellow in Pediatric Critical Care Medicine). I mentored Dr. Aganga on a clinical research project about non-invasively monitoring autoregulation in pediatric patients resuscitated from cardiac arrest. Devon is now faculty in

pediatric anesthesiology and critical care medicine at the Mayo Clinic. Under my direction, Dr. Aganga accomplished:

- a. Abstract and Poster: Cerebrovascular Autoregulation After Pediatric Cardiac Arrest. International Assembly for Pediatric Anesthesia, Washington D.C., 10/10/12–10/12/12.
- b. Abstract and Poster: Cerebrovascular Autoregulation After Pediatric Cardiac Arrest. American Society of Anesthesiologists, Washington D.C., 10/13/12–10/17/12.
- c. Original research manuscript publication: #20 in Original Research Publications section (please refer to page 2-4 of CV)

8/1/10–6/30/12

Abby Larson, BS (medical student). Ms. Larson initially began as my laboratory technician and clinical research coordinator. She developed a strong interest in becoming a clinician-scientist, and we soon developed a mentor-mentee relationship. Under my encouragement and guidance, Ms. Larson applied to medical school and attended the Johns Hopkins University School of Medicine. She is currently in surgery residency at the Brigham and Women's Hospital, Harvard Medical School. Abby is also pursuing research about the management of congenital diaphragmatic hernias with the Children's Hospital of Philadelphia. Under my direction, Ms. Larson's accomplishments included:

- a. Original research manuscript publications: #13, 15, 16, 18, and 20 in Original Research Publications section (please refer to page 2-4 of CV)
- b. Poster presentation: Monitoring cerebrovascular autoregulation in a swine model of pediatric cardiac arrest with near-infrared spectroscopy. Johns Hopkins 13th Annual Anesthesia Critical Care Medicine Research Day. Baltimore, MD. 12/7/11.
- c. Abstract and Poster: Cerebrovascular autoregulation in neonatal hypoxic-ischemic encephalopathy. International Assembly for Pediatric Anesthesia, Washington D.C., 10/10/12–10/12/12.
- d. Invited oral research presentation: Cerebrovascular autoregulation in neonatal hypoxic-ischemic encephalopathy. American Society of Anesthesiologists, Washington D.C., 10/13/12–10/17/12.
- e. Abstract and Poster: Cerebrovascular autoregulation in neonatal hypoxic-ischemic encephalopathy. JHU ACCM Research Day. 12/10/12.

9/1/10–6/30/13

Jessica Howlett, MD (fellow in Neonatology). I mentored Dr. Howlett in clinical research projects about neonatal hypoxic-ischemic encephalopathy, cerebrovascular autoregulation, neurologic injury on MRI, and evidence of neurologic injury on amplitude-integrated EEG. I also served on Dr. Howlett's Scholarly Oversight Committee. Dr. Howlett is now a practicing neonatologist with a private practice group (Sunflower Neonatology Associates) in the Kansas City area. Under my direction, Dr. Howlett accomplished:

- a. Original research manuscript publications: #16 and 22 in Original Research Publications section (please refer to page 2-4 of CV)
- b. Invited oral research presentation and abstract: Monitoring cerebral autoregulation in neonatal hypoxic-ischemic encephalopathy (HIE). Pediatric Academic Societies: Eastern Society for Pediatric Research. Philadelphia, PA. 3/31/12.

Awarded the Eastern Society for Pediatric Research Travel Award

c. Research grant proposal to Neonatal Resuscitation Program with Dr. Howlett as Principal Investigator to investigate cerebral autoregulation, therapeutic hypothermia, and rewarming in neonatal hypoxic ischemic encephalopathy. 4/1/12.

d. Invited oral research presentation: “Cerebral Autoregulation, Hypothermia, and Neonatal hypoxic-ischemic encephalopathy (HIE).” Johns Hopkins University Pediatric Grand Rounds. Baltimore, MD. 4/25/12.

e. Abstract and poster: Hemoglobin Volume Index: Translating cerebral autoregulation monitoring from piglet model to neonatal HIE. American Academic of Pediatrics, Section on Perinatal Pediatrics, 80th Perinatal and Developmental Medicine Symposium. Aspen, CO. 6/7/12–6/10/12.

f. Abstract and poster: Monitoring Cerebral Autoregulation in Neonatal HIE: What is an Infant's Optimal MAP?. The 7th International Conference on Brain Monitoring and Neuroprotection in the Newborn. Tampa, FL. 9/13/12–9/15/12.

g. Abstract and poster: Non-Invasive Autoregulation Monitoring In Neonatal Hypoxic Ischemic Encephalopathy. American Academy of Pediatrics (AAP) National Conference and Exhibition. New Orleans, LA. 10/20/12–10/23/12.

Awarded the American Academy of Pediatrics National Conference Travel Grant

h. Invited research talk: “Cerebral Autoregulation in the Neonate: An Opportunity for Brain Specific Therapy.” Children’s Mercy Hospital. Kansas City, MO. 1/7/12.

8/15/11–present Monica Williams, MD (fellow and junior faculty in Pediatric Anesthesiology; T32 training grant recipient). I mentored Dr. Williams on a clinical research project about non-invasively monitoring autoregulation in patients with Moyamoya disease during neurosurgical revascularization and postoperatively. Dr. Williams is now an Assistant Professor at Johns Hopkins in Pediatric Anesthesiology. I remain Monica’s primary mentor on clinical autoregulation studies, and I was on her T32 mentoring committee for her research in neuroninflammation and anesthesia exposure in a rabbit model of cerebral palsy. Under my direction, Dr. Williams accomplished:

a. Original research manuscript publications: #15 and 32 in Original Research Publications section (please refer to page 2-4 of CV)

b. Review article: #3 in Review Articles Publications section (please refer to page 4)

c. Abstract and poster: A novel approach to monitoring cerebral autoregulation in Moyamoya patients. Society for Pediatric Anesthesia. Tampa, FL. 2/23/12–2/26/12.

d. Abstract and poster: Cerebrovascular Autoregulation in Pediatric MoyaMoya. International Assembly for Pediatric Anesthesia, Washington D.C., 10/10/12–10/12/12.

e. Invited oral research presentation: Cerebrovascular Autoregulation in Pediatric MoyaMoya. American Society of Anesthesiologists, Washington D.C. 10/13/12–10/17/12.

f. Abstract and poster: Cerebrovascular autoregulation in pediatric moyamoya. JHU ACCM Research Day. Baltimore, MD. 12/10/12.

g. Clinical guidelines for the German Society of Anaesthesiology and Intensive Care Medicine on patients with Moyamoya syndrome. I mentored Dr. Williams in writing these guidelines, which are

published on http://www.orphananesthesia.eu/en/rare-diseases/published-guidelines/cat_view/61-rare-diseases/60-published-guidelines/106-moyamoya-disease.html.

2/1/12–6/30/13

Emmett Whitaker, MD (fellow in Pediatric Anesthesiology). I mentored Dr. Whitaker on a laboratory project to examine pediatric anesthesia neurotoxicity in a neonatal swine model. I also supervised Dr. Whitaker on a clinical project about the association between autoregulatory function after pediatric cardiac arrest and neurologic outcomes. After completing his pediatric anesthesia fellowship at Johns Hopkins, Dr. Whitaker joined the faculty at Nationwide Children's Hospital in Pediatric Anesthesiology. He later obtained research funding for pediatric anesthesia neurotoxicity research from the Society for Pediatric Anesthesia Young Investigator Research Grant. Under my direction, Dr. Whitaker accomplished:

- a. Original research manuscript publication: #20 in Original Research Publications section (please refer to page 2-4 of CV)
- b. Research grant proposal to The Thrasher Foundation to examine anesthesia-related neurotoxicity in neonatal swine with Dr. Whitaker as the Principal Investigator. 5/19/12.
- c. Research grant proposal to The Armstrong Institute Small Grants Program to evaluate neurotoxicity from volatile anesthetics in neonatal swine with Dr. Whitaker as the Principal Investigator. 6/30/12.
- d. Abstract and poster: Cerebrovascular Autoregulation After Pediatric Cardiac Arrest. International Assembly for Pediatric Anesthesia, Washington D.C. 10/10/12–10/12/12.
- e. Abstract and poster: Cerebrovascular Autoregulation After Pediatric Cardiac Arrest. American Society of Anesthesiologists, Washington D.C. 10/13/12–10/17/12.
- f. Abstract and poster: Cerebrovascular Autoregulation After Pediatric Cardiac Arrest. JHU Anesthesia and Critical Care Medicine (ACCM) Research Day. 12/10/12. Awarded the Johns Hopkins Anesthesiology and Critical Care Medicine Research Day 2nd place Award.
- g. Abstract and poster: Exposure to inhaled anesthesia does not induce neuronal apoptosis in neonatal piglets. Society for Pediatric Anesthesia. Las Vegas, NV. 3/14/13–3/17/13.

6/30/12–8/1/13

Nicole Moy (High school student). I mentored Ms. Moy in the Gifted and Talented Intern/Mentor Program for the Howard County Public School System (Maryland). Nicole worked in our laboratory with a swine model of hypoxic brain injury, therapeutic hypothermia, and rewarming. Ms. Moy also shadowed me in the operating rooms. Under my guidance, Ms. Moy accomplished:

- a. Original research manuscript publication: #21 in Original Research Publications section (please refer to page 2-4 of CV)
- b. Abstract and poster: Rewarming from therapeutic hypothermia induces cerebral cortical neuron apoptosis in a swine model of neonatal hypoxic-ischemic encephalopathy. JHU ACCM Research Day. Dec. 4, 2013. Baltimore, MD.
- c. Abstract and poster: Rewarming from therapeutic hypothermia induces cerebral cortical neuron apoptosis in a swine model of neonatal hypoxic-ischemic encephalopathy. Society for Pediatric Anesthesiology. March 7-9, 2014. Ft. Lauderdale, FL.

- 7/1/12–5/30/14 Jeong-Hoo “Eric” Lee, BS (Medical student). Eric worked as my research technician in the laboratory and worked with me on clinical studies. I mentored him for his medical school applications and encouraged him to pursue a career as a clinician-scientist. Eric then attended The Eastern Virginia Medical School followed by residency in psychiatry at the University of Virginia. Under my guidance, Eric accomplished:
- a. Original research manuscript publications: #20, 21, 22, 25, 26, and 30 in Original Research Publications section (please refer to page 2-4 of CV)
 - b. Abstract and poster: Rewarming from therapeutic hypothermia induces cerebral cortical neuron apoptosis in a swine model of neonatal hypoxic-ischemic encephalopathy. JHU ACCM Research Day. Dec. 4, 2013. Baltimore, MD.
 - c. Abstract and poster: Rewarming from therapeutic hypothermia induces cerebral cortical neuron apoptosis in a swine model of neonatal hypoxic-ischemic encephalopathy. Society for Pediatric Anesthesiology. March 7-9, 2014. Ft. Lauderdale, FL.
 - d. Abstract and poster: Rewarming from therapeutic hypothermia induces cortical apoptosis in a swine model of neonatal hypoxic-ischemic encephalopathy. The 9th Hershey Conference on Developmental Brain Injury. June 3-6, 2014. Saint Michaels, MD.
 - e. Abstract and poster: Neuroinflammation in a swine model of pediatric cardiac arrest. The 9th Hershey Conference on Developmental Brain Injury. June 3-6, 2014. Saint Michaels, MD.
 - f. Abstract selected for featured oral research presentation: Rewarming from therapeutic hypothermia induces caspase-3 activation and apoptosis of cortical neurons in a swine model of neonatal hypoxic-ischemic encephalopathy. Society for Neuroscience. November 15-19, 2014. Washington, D.C.
- 8/1/13–6/30/16 Matt O’Connor, MD (Neonatology fellow). I serve on Dr. O’Connor’s Scholarly Oversight Committee. Under my guidance, Dr. O’Connor worked on projects about cerebrovascular autoregulation in neonates with hypoxic-ischemic encephalopathy who receive therapeutic hypothermia with different sedation regimens. He is now a neonatologist at the New York State University.
- a. Original research manuscript publications: #27, 28, and 29 in Original Research Publications section (please refer to page 2-4 of CV)
 - b. Abstract and poster: Cerebral autoregulation during rewarming from therapeutic hypothermia and 2-year neurodevelopmental outcomes in neonates with hypoxic ischemic encephalopathy. 16th Annual Johns Hopkins University Anesthesiology and Critical Care Medicine Research Day. December 8, 2014. Baltimore, MD
 - c. Abstract selected for featured oral presentation: Cerebral autoregulation during rewarming from therapeutic hypothermia and 2-year neurodevelopmental outcomes in neonates with hypoxic ischemic encephalopathy. The American Academy of Pediatrics. October 23, 2015. Washington, D.C.
 - d. Abstract and poster: Autoregulation in small for gestational age infants during rewarming after 72h of therapeutic hypothermia for hypoxic-ischemic encephalopathy. Eastern Society for Pediatric Research. March 11–13, 2016. Philadelphia, PA.

e. Abstract and poster: Autoregulation in Small for Gestational Age Infants during Rewarming after 72h of Therapeutic Hypothermia for Hypoxic-Ischemic Encephalopathy. Pediatric Academic Societies. April 30–May 3, 2016. Baltimore, MD.

4/15/2014–present Michael Reyes, BA (Pre-medical student). Michael began working in our laboratory as a volunteer, and then he was hired as a laboratory technician. I am now mentoring Michael on a laboratory project about endoplasmic reticulum stress and oligodendrocyte and neuronal cell death mechanisms during therapeutic hypothermia and rewarming in a neonatal swine model of hypoxic brain injury. I will also mentor him during his medical school application process. Under my guidance, Michael accomplished:

a. Original research manuscript publications: #21, 25, 26, 27, 28, 29, 32, 34,

b. Abstract and poster: Rewarming from therapeutic hypothermia induces cortical apoptosis in a swine model of neonatal hypoxic-ischemic encephalopathy. The 9th Hershey Conference on Developmental Brain Injury. June 3-6, 2014. Saint Michaels, MD.

c. Abstract and poster: Rewarming from therapeutic hypothermia induces caspase-dependent cortical neuron apoptosis in a swine model of neonatal hypoxic-ischemic encephalopathy. American Neurological Association. October 10-11, 2014. Baltimore, MD.

d. Abstract selected for featured oral research presentation: Rewarming from therapeutic hypothermia induces caspase-3 activation and apoptosis of cortical neurons in a swine model of neonatal hypoxic-ischemic encephalopathy. Society for Neuroscience. November 15-19, 2014. Washington, D.C.

e. Abstract and poster presentation: Cerebral autoregulation during rewarming from therapeutic hypothermia and 2-year neurodevelopmental outcomes in neonates with hypoxic ischemic encephalopathy. 16th Annual Johns Hopkins University Anesthesiology and Critical Care Medicine Research Day. December 8, 2014. Baltimore, MD.

f. Abstract and poster presentation: Reyes M, Armstrong JS, Wang B, Kulikowicz E, Bhalala U, Spicer D, Yang ZJ, Koehler RC, Martin, LJ, **Lee JK**. Hypoxia ischemia activates the unfolded protein response and rewarming from hypothermia promotes white matter apoptosis in a neonatal piglet model. 16th Annual Johns Hopkins University Anesthesiology and Critical Care Medicine Research Day. December 8, 2014. Baltimore, MD.

g. Abstract and poster presentation: A pilot cohort study of cerebral autoregulation and 2-year neurodevelopmental outcomes in neonates with hypoxic-ischemic encephalopathy who received therapeutic hypothermia. 44th Annual Meeting of the Child Neurology Society. October 7–10, 2015. Washington, DC.

h. Abstract and poster presentation: White matter apoptosis is increased by delayed hypothermia and rewarming in a neonatal piglet model of hypoxic ischemic encephalopathy. 17th Annual Johns Hopkins University Anesthesiology and Critical Care Medicine Research Day. November 30, 2015. Baltimore, MD.

i. Abstract and poster presentation: The effect of asphyxia duration of ETCO₂-directed CPR. 17th Annual Johns Hopkins University Anesthesiology and Critical Care Medicine Research Day. November 30, 2015. Baltimore, MD.

j. Abstract and poster presentation: Age-dependent selective brain cooling with transnasal flow of dry ambient air. 17th Annual Johns Hopkins University Anesthesiology and Critical Care Medicine Research Day. November 30, 2015. Baltimore, MD.

k. Abstract and poster presentation: Autoregulation in Small for Gestational Age Infants during Rewarming after 72h of Therapeutic Hypothermia for Hypoxic-Ischemic Encephalopathy. Pediatric Academic Societies. April 30-May 3, 2016. Baltimore, MD.

l. Abstract and poster presentation; also selected as top abstract for oral research presentation: Delayed hypothermia and rewarming activate a glial unfolded protein response with apoptosis independent of hypoxic-ischemic brain injury in a piglet model. Keystone Symposia on Common Mechanisms of Neurodegeneration. Keystone, CO. June 12–16, 2016.

m. Abstract and poster: Microglial proliferation in the piglet brain is region specific after cardiac arrest. Society of Critical Care Medicine. January 21-25, 2017. Honolulu, Hawaii.

n. Abstract and poster: Microglial proliferation in the piglet brain is region specific after cardiac arrest. Johns Hopkins University Anesthesiology and Critical Care Medicine Research Day. October 13, 2016. Baltimore, MD.

o. Abstract and poster: Protein Oxidation Occurs Despite Therapeutic Hypothermia in Asphyxic Piglet Brain. Johns Hopkins University Anesthesiology and Critical Care Medicine Research Day. October 13, 2016. Baltimore, MD.

p. Abstract and poster: Comparison of Physiologic Feedback Using End-tidal Carbon Dioxide Levels versus Relaxation Arterial Pressure Levels to Guide Chest Compression Delivery during CPR. Johns Hopkins University Anesthesiology and Critical Care Medicine Research Day. October 13, 2016. Baltimore, MD.

q. Abstract and poster: Patterns of cell death in a swine model of hypoxic-asphyxic cardiac arrest and delayed hypothermia. Society for Neuroscience. Nov 11–15, 2017. Washington, D.C.

r. Abstract and poster: Insufficient proteasome function: a possible cause of white matter injury during hypothermia for neonatal hypoxic-ischemic encephalopathy (HIE). 10th International Conference on Brain Monitoring and Neuroprotection in the Newborn. Killarney, Ireland. Oct 5-7, 2017.

10/1/14–7/1/15 Jon Hochstein (Biomedical engineering student at Johns Hopkins University). Jon worked in our piglet lab to develop an “adhesive” and cuff design for endotracheal tubes that would decrease the risk of accidental extubation or dislodgement of a double-lumen endotracheal tube. I arranged for Jon to shadow anesthesiologists and surgeons in the Johns Hopkins pediatric operating rooms twice a week, including my operating rooms. I also arranged for him to work with other anesthesia-surgery teams so he would be exposed to a variety of patient cases with different anesthetic and surgical techniques. After completing college, he now works at the NIH to develop cyber-skeleton technology to improve mobility in children with cerebral palsy.

11/1/15–present Caitlin O’Brien, M.D. Caitlin is an Assistant Professor in the Johns Hopkins Pediatric Critical Care Medicine department and a T32 grant recipient. I am mentoring her in a study to test the inflammatory response to delayed hypothermia and rewarming in a piglet model of neonatal hypoxic-ischemic brain injury and cardiac arrest. Caitlin is learning the piglet model as well as basic laboratory techniques for inflammation assays. Under my guidance, Caitlin accomplished:

- a. Johns Hopkins Training Program for Clinician Scientists in Pediatric Critical Cardiopulmonary Disease T32 grant. I was Caitlin's primary mentor. 7/1/16 – 7/1/18.
- b. Research grant award: Pearl M. Stetler Fellowship Award. "Use of a Soluble Epoxide Hydrolase Inhibitor to Reduce Neuroinflammation and Neuronal Death after Pediatric Asphyxial Cardiac Arrest." I was her primary mentor. 7/2018–7/2019 \$65,000 for salary support and supplies
- c. NIH NINDS Loan Repayment Program grant. 8/2018–8/2020. I was her mentor.
- d. Original research manuscripts #37, 38, 39 in Original Research Publications section (please refer to page 2-4 of CV)
- e. Abstract and poster: Microglial proliferation in the piglet brain is region specific after cardiac arrest. Johns Hopkins University Anesthesiology and Critical Care Medicine Research Day. October 13, 2016. Baltimore, MD.
- f. Abstract and poster: Protein Oxidation Occurs Despite Therapeutic Hypothermia in Asphyxic Piglet Brain. Johns Hopkins University Anesthesiology and Critical Care Medicine Research Day. October 13, 2016. Baltimore, MD.
- g. Abstract and poster: Comparison of Physiologic Feedback Using End-tidal Carbon Dioxide Levels versus Relaxation Arterial Pressure Levels to Guide Chest Compression Delivery during CPR. Johns Hopkins University Anesthesiology and Critical Care Medicine Research Day. October 13, 2016. Baltimore, MD.
- h. Abstract and oral presentation: Microglial proliferation in the piglet brain is region specific after cardiac arrest. Society of Critical Care Medicine. January 21-25, 2017. Honolulu, Hawaii.
- i. Abstract and poster: Microglial proliferation in the piglet brain is region specific after cardiac arrest. Pediatric Academic Societies. May 6–9, 2017. San Francisco, CA.
- j. Abstract and poster: Insufficient proteasome function may cause white matter injury during hypothermia for neonatal hypoxic-ischemic encephalopathy. Society for Neuroscience. Nov 11–15, 2017. Washington, D.C.
- k. Abstract and poster: Patterns of cell death in a swine model of hypoxic-asphyxic cardiac arrest and delayed hypothermia. Society for Neuroscience. Nov 11–15, 2017. Washington, D.C.
- l. Awarded The 2017 Pediatric Neurocritical Care Research Group Fellow Travel Award for her putamen neuronal cell death work in the piglet cardiac arrest model.
- m. Oral research presentation: Neuronal death in putamen after pediatric cardiac arrest and therapeutic hypothermia. Pediatric Neurocritical Care Research Group. September 23, 2017. Madison, WI
- n. Johns Hopkins StAAR (Stimulating and Advancing ACCM Research) Mentored Training Grant. Use of a Soluble Epoxide Hydrolase Inhibitor to Reduce Neuroinflammation and Neuronal Death after Pediatric Asphyxial Cardiac Arrest. 1/1/18–12/31/19. I was her primary mentor.

- o. Abstract and poster: Polyphenol oleuropein is a brain proteasome activator and potential therapeutic for white matter damage after neonatal hypoxia-ischemia and hypothermia. Pediatric Academic Societies. May 5-8, 2018. Toronto, Canada.
- p. Abstract and poster: Hypothermia protects the putamen but not the white matter after neonatal hypoxia-ischemia in piglets. 11th Hershey Conference on Developmental Brain Injury. Jun 6-9, 2018. Asilomar, CA.
- q. Poster (also selected for oral research presentation; talk was given by Dr. Lee): Proteasome insufficiency contributes to white matter injury in a piglet model of neonatal hypoxic-ischemic encephalopathy. Pediatric Academic Societies. May 5–8, 2018. Toronto, Canada.

4/1/16–present

May Chen, M.D. May is a Johns Hopkins neonatology fellow. I am mentoring her in a study about oxygenation measurements in necrotizing enterocolitis. Under my guidance, May learned a piglet model of whole body and gut-specific ischemia to examine the utility of splanchnic NIRS monitoring compared to portal vein oxygenation and laser Doppler measures of splanchnic blood flow. After May successfully completed her NIRS project, we moved her to a randomized study of a mitochondrial transition pore inhibitor in neonatal hypoxic-ischemic brain injury. I also serve on May's Scholarly Oversight Committee. In addition, I mentored May in clinical research for autoregulation monitoring in neonates with hypoxic-ischemic encephalopathy. Under my mentorship May accomplished:

- a. Original research manuscript publication: #34, 37 in Original Research Publications section (please refer to page 2-4 of CV)
This manuscript was awarded the Francis F. Schwenker Award for Excellence in Research by the Johns Hopkins Department of Pediatrics in 6/2018
- b. Abstract and poster: Abdominal near-infrared spectroscopy in a piglet model of gastrointestinal hypoxia using graded hypoxia or superior mesenteric artery ligation. Pediatric Academic Societies. May 6–9, 2017. San Francisco, CA
- c. Abstract and poster: Insufficient proteasome function may cause white matter injury during hypothermia for neonatal hypoxic-ischemic encephalopathy. Society for Neuroscience. Nov 11–15, 2017. Washington, D.C.
- d. Oral research presentation: Abdominal Near-Infrared Spectroscopy in a Piglet Model of Gastrointestinal Hypoxia Using Graded Hypoxia or Superior Mesenteric Artery Ligation. American Academy of Pediatrics (AAP) National Conference & Exhibition. Sept 16, 2017. Chicago, IL.
Awarded an American Academy of Pediatrics Research Travel Award
- e. Abstract: Polyphenol oleuropein is a brain proteasome activator and potential therapeutic for white matter damage after neonatal hypoxia-ischemia and hypothermia. Pediatric Academic Societies. May 5-8, 2018. Toronto, Canada.
- f. Abstract: Hypothermia protects the putamen but not the white matter after neonatal hypoxia-ischemia in piglets. 11th Hershey Conference on Developmental Brain Injury. Jun 6-9, 2018. Asilomar, CA.
- g. Oral research presentation: Abdominal near infrared spectroscopy in a piglet model of splanchnic hypoxia. 42nd Southeastern Conference on Perinatal Research. American Academy of Pediatrics, Section on Neonatal-Perinatal Medicine. Feb 7-9, 2018. Clearwater Beach, FL.

- h. Poster (also selected for oral research presentation; talk was given by Dr. Lee): Proteasome insufficiency contributes to white matter injury in a piglet model of neonatal hypoxic-ischemic encephalopathy. Pediatric Academic Societies. May 5–8, 2018. Toronto, Canada.
- i. Invited talk: “NIRS detects splanchnic hypoxia and hypoperfusion in two piglet models.” Grand Rounds, JHU Dept. of Pediatrics. 5/23/2018

4/15/16–12/31/16 Allison Fernandez, M.D. Allison is a pediatric anesthesiologist at Johns Hopkins All Children’s Hospital. I assisted Allison with research on the risks of severe blood loss during posterior spinal fusion and the associations with race, platelet dysfunction, and other undiagnosed coagulopathies. I specifically helped her with study design, writing a proposal, formulating research questions and hypotheses, and career development as a potential clinician-scientist. I was a member of Allison’s research advisory committee. I assisted Allison with completing:

- a. Letter of Intent for research funding from the Society of Pediatric Anesthesia. 6/1/16.

6/15/15–present Hannah Lee. Hannah is a pre-medical student at the University of Maryland. She spent two summers and one winter break in our laboratory (plus working additional shifts as her school schedule permitted). She learned the piglet model of cardiac arrest/hypoxic brain injury and western blotting. Under my guidance, Hannah accomplished:

- a. Abstract and poster: Microglial proliferation in the piglet brain is region specific after cardiac arrest. Society of Critical Care Medicine. January 21-25, 2017. Honolulu, Hawaii.
- b. Abstract and poster: Microglial proliferation in the piglet brain is region specific after cardiac arrest. Johns Hopkins University Anesthesiology and Critical Care Medicine Research Day. October 13, 2016. Baltimore, MD.
- c. Abstract and poster: Microglial proliferation in the piglet brain is region specific after cardiac arrest. Pediatric Academic Societies. May 6–9, 2017. San Francisco, CA.

6/15/16–8/15/16 Josh Mehr. Hannah is a pre-medical student at Johns Hopkins University. He learned western blotting and used NeuroLucida software to analyze microglia morphology in the piglet model of hypoxic brain injury. Under my guidance, Josh accomplished:

- a. Abstract and poster: Microglial proliferation in the piglet brain is region specific after cardiac arrest. Society of Critical Care Medicine. January 21-25, 2017. Honolulu, Hawaii.
- b. Abstract and poster: Microglial proliferation in the piglet brain is region specific after cardiac arrest. Johns Hopkins University Anesthesiology and Critical Care Medicine Research Day. October 13, 2016. Baltimore, MD.
- c. Abstract and poster: Microglial proliferation in the piglet brain is region specific after cardiac arrest. Pediatric Academic Societies. May 6–9, 2017. San Francisco, CA.

6/30/16–8/30/16t Abel Sapirstein was a high school student who volunteered in our piglet laboratory. I then mentored him for a 6-week, full-time research project about neonatal HIE, therapeutic hypothermia, and white matter injury. This full-time research apprenticeship was through his school’s professional development program.

7/1/16–6/30/17 Alyssa Padover, MD was my pediatric anesthesiology fellow. I mentored her in career planning, work-life balance, and in writing the following invited chapter:

a. Book chapter: #6 in Book Chapters, Monographs section (please refer to page 4)

10/1/16–present Melisa Carrasco McCaul, M.D. is a JHU neurology resident who plans to pursue a fellowship in neonatal neurology. I am Melisa’s R25 research training grant mentor using the piglet model of hypoxic-ischemic brain injury. I also mentored Melisa on a clinical project about how accurately NIRS cerebrovascular autoregulation monitoring predicts different techniques of brain injury measurements on MRI, and how these relate to neurodevelopmental outcomes. Under my guidance, Melisa accomplished:

- a. Original research manuscript: #33 in Original Research Publications section (please refer to page 2-4 of CV)
- b. Abstract and poster: Comparison of DTI ADC scalar and qualitative evaluation of brain MRI in cooled newborns with neonatal encephalopathy. Pediatric Academic Societies. May 6–9, 2017. San Francisco, CA
- c. Abstract and poster: The blood pressure with optimized cerebral autoregulation is associated with MRI apparent diffusion coefficient scalars in neonatal hypoxic-ischemic encephalopathy. 10th International Conference on Brain Monitoring and Neuroprotection in the Newborn. Killarney, Ireland. Oct 5-7, 2017.
- d. Abstract and poster: Cerebral oximetry and blood pressure in association with DTI ADC scalars and the NICHD Neonatology Research Network brain injury score in newborns cooled for neonatal encephalopathy. 10th International Conference on Brain Monitoring and Neuroprotection in the Newborn. Killarney, Ireland. Oct 5-7, 2017.
- e. Abstract and poster: Comparison of DTI ADC scalars and the NIH NICHD Neonatology Research Network brain injury score in newborn cooled for neonatology encephalopathy. 10th International Conference on Brain Monitoring and Neuroprotection in the Newborn. Killarney, Ireland. Oct 5-7, 2017.
- f. NIH R25 grant (2018–present): Autophagy and white matter injury in the piglet HIE model. I am her mentor.

2/1/17–present Panagiotis Kratimenos, M.D. is an adjunct Assistant Professor in the JHU Dept. of Anesthesiology and Critical Care Medicine and an attending neonatologist at Children’s National Health Systems in Washington, D.C. I mentored Panos’ research with our neonatal piglet hypoxia-ischemia model and on a project about optic tract injury after hypoxia-ischemia, hypothermia, and rewarming.

1/1/18–present C. Danielle Hopkins, BA is a pre-medical student who worked in my lab as a technician. I mentored her during her application to medical school, counseled her on selecting programs, career options, etc.

- a. Poster (also selected for oral research presentation; talk was given by Dr. Lee): Proteasome insufficiency contributes to white matter injury in a piglet model of neonatal hypoxic-ischemic encephalopathy. Pediatric Academic Societies. May 5–8, 2018. Toronto, Canada.
- b. Original research manuscript: #37 in Original Research Publications section (please refer to page 2-4 of CV)

5/1/18–9/1/18 Erik Smith, M.D., J.D., M.S. is junior faculty in the JHU Division of Pediatric Anesthesiology. I was asked to write an invited review about abusive head trauma, and I instead invited Erik to write the article with me. I mentored Erik for this process.

a. Smith E, Lee JK, Vavilala M. Pediatric Non-Accidental Trauma, Traumatic Brain Injury, and Sports Concussions. Cutting-Edge Trauma and Emergency Care special edition. *Anesthesiology Clinics* 2018.

7/1/18–9/1/18 Henry Hardart is a high school student who observed piglet experiments over the summer. I counseled him on applying to medical school, thinking of career options, and on basic research knowledge.

Thesis Committees

October 2015 Chair for PhD oral examination committee in Pathobiology, JHU School of Medicine

September 2018 Master of Science Thesis committee, Institute of Medical Science, University of Toronto, external reviewer.

October 2018 PhD oral examination in Pathobiology, JHU School of Medicine

Training Grant Participation

11/2015–6/2018 NIH T32 grant, Johns Hopkins Training Program for Clinician Scientists in Pediatric Critical Cardiopulmonary Disease: Mentor for Dr. Caitlin O'Brien (pediatric critical care junior faculty). The inflammatory response to hypothermia and rewarming in a piglet model of neonatal hypoxic-ischemic encephalopathy.
Direct costs: \$68,275
Indirect costs: \$4,780

8/2018–present NIH NINDS R25 grant: Mentor for Dr. Melisa Carrasco McCaul (pediatric neurology fellow). Autophagy in the piglet model of hypoxic-ischemic encephalopathy.
Direct costs: \$36,988

11/1/15–present: Pearl M. Stetler Research Fellowship Award: Mentor for Dr. Caitlin O'Brien (pediatric critical care junior faculty). The Inflammatory response to cardiac arrest and the cell death continuum in a neonatal swine model.
Direct costs: \$65,000

CLINICAL ACTIVITIES

Clinical Focus

I provide pediatric anesthesia in the Johns Hopkins Hospital operating rooms and remote locations (interventional radiology, diagnostic radiology services, cardiac catheterization laboratory, etc.) on a weekly basis, year-round. I work as the supervising attending physician for fellows, residents, and nurse anesthetists as well as a solo practitioner.

Certification

Medical

2005–present Medical Licensure, State of Maryland

Boards

- 2005–2012: Board Certified by The American Board of Pediatrics, General Pediatrics (identification number 665506)
- 2008–present: Board Certified by The American Board of Anesthesiology, Inc., General Anesthesiology (certificate number 44740)
- 2013–present: Board Certified by The American Board of Anesthesiology, Inc., Pediatric Anesthesiology (certificate number 44740)

Clinical Responsibilities

- 2010–present Attending pediatric anesthesiologist

Clinical Productivity

I have exceeded my assigned clinical effort every year. In 2016, I decreased my call commitment so I could focus more on my research and mentoring.

- 1/1/10–6/30/11: average 2.6 days per week; 100% call load (3 times/month)
- 7/1/11–6/30/12: average 2.6 days per week; 100% call load (3 times/month)
- 7/1/12–6/30/13: average 2.5 days per week; 100% call load (3 times/month)
- 7/1/13–6/30/14: average 2.5 days per week; 100% call load (3 times/month)
- 7/1/14–6/30/15: average 2 days per week; 100% call load (3 times/month)
- 7/1/15–6/30/16: average 2 days per week; 100% call load (2 times/month in-house/ in-hospital call)
- 7/1/16–6/30/17: average 1.9 days per week; 88% call load (1-2 times/month in-house/ in-hospital call)
- 7/1/17–6/30/18: average 1.8 days per week; 66% call load (1-2 times/month in-house/ in-hospital call)

Clinical Program Building/Leadership

- 1/2018–7/2018 I assisted in developing certified nurse anesthetist (CRNA) shifts exclusively for the Johns Hopkins Pediatric Anesthesiology Division. The goal in introducing these pediatric-exclusive shifts was to improve patient care and continuity, improve quality of life at work for CRNAs, improve retention of skilled CRNAs, and improve staffing stability in the pediatric operating room. I helped the CRNAs write a proposal outlining their needs and the new pediatric-exclusive shifts.

Development of nationally/internationally recognized clinical standard of care

- 5/2014 German Society of Anaesthesiology and Intensive Care Medicine
I wrote clinical guidelines for anesthesia in moyamoya disease
http://www.orphananesthesia.eu/en/rare-diseases/published-guidelines/cat_view/61-rare-diseases/60-published-guidelines/106-moyamoya-disease.html
Mentee: Monica Williams, MD

SYSTEM INNOVATION AND QUALITY IMPROVEMENT ACTIVITIES

International

Production of Guidelines and/or Protocols

- 5/2014 German Society of Anaesthesiology and Intensive Care Medicine
Clinical guidelines for anesthesia in moyamoya disease
Published online: http://www.orphananesthesia.eu/en/rare-diseases/published-guidelines/cat_view/61-rare-diseases/60-published-guidelines/106-moyamoya-disease.html
Role: Consultant and mentor

I was asked to write clinical guidelines about the care of patients with Moyamoya disease for the German Society of Anaesthesiology and Intensive Care Medicine. I instead invited Dr. Monica Williams (junior faculty) to write these guidelines as the primary author, and I mentored her during the process.

Within Johns Hopkins Medicine

9/1/15–12/31/16: Co-Chair of Work-Life Balance Pilot Project (Points Bank on the Job, “PB&J”): developed and launched a program to “reward” clinicians for serving duties that generally do not provide compensation, including participation in clinical guidelines committees, search committees, grant peer review committees, mentoring (with measurable outcomes), abstract and poster presentations, manuscript and grant submissions, etc. In exchange for participating in these activities, clinicians earn “points” that can be used toward food delivery, house keeping, fitness classes, dry cleaning, etc. that help improve work-life balance. The overall goals of this program are to improve faculty retention, decrease burn out, and increase work productivity, which is measured by grant applications (and funded applications), manuscript publications, abstract and poster presentations, etc. The Mark Rogers Dowry at Johns Hopkins University funded this pilot project (\$50,000) in the Division of Pediatric Anesthesiology.

ORGANIZATIONAL ACTIVITIES

Editorial Activities

Editorial Board Appointments

1/2018–present *Anesthesia and Analgesia*, Assistant Editor

Ad hoc journal reviews for Anesthesia and Analgesia; Anesthesiology; Anesthesia and Analgesia Practice; Brain Research; Journal of Applied Physiology; Journal of Cerebral Blood Flow and Metabolism; Journal of Neurophysiology; J of Physiology; Pediatric Anesthesia; Pediatric Cardiology; Pediatric Critical Care Medicine; Pediatric Research

Advisory Committees, Review Groups/Study Sections

National and International

June 2011–present Society for Pediatric Anesthesia Research Committee
Oct. 2012 International Assembly for Pediatric Anesthesia: Research committee, abstract reviewer, poster session moderator for “Neurosciences” research section. Washington D.C.
March 2012–present Society for Pediatric Anesthesia Education Committee
March 2012 Society for Pediatric Anesthesia: Research Committee, abstract reviewer. Las Vegas, NV.
March 2014 Society for Pediatric Anesthesia: Research Committee, abstract reviewer, poster session moderator for “Anesthesia Outcomes and Safety.” Ft. Lauderdale, FL.
March 2015 American Heart Association: grant review study section (Cardiac Arrest/Resuscitation – Clinical Investigations and Population)
Oct. 2015 American Heart Association: grant review study section (Cardiac Arrest/Resuscitation – Basic/Clinical Investigations and Population)
Dec. 2015 American Heart Association: letter of intent review study section (Collaborative Science Award)
April 2016 American Heart Association: grant review study section (Cardiac Arrest/Resuscitation – Basic/Clinical Investigations and Population)
Sept. 2016 Ireland Health Research Board: grant review study section (invited external reviewer)
Oct. 2016 American Heart Association: grant review study section (Cardiac Arrest/Resuscitation – Basic/Clinical Investigations and Population)
Oct. 2016–present Board of Directors, Society for Pediatric Anesthesia
Nov. 2016 American Heart Association: letter of intent review study section (Collaborative Science Award)

April 2016	New Zealand Neurological Foundation: grant review study section (invited external reviewer)
May 2016	American Heart Association: grant review study section (Cardiac Arrest/Resuscitation – Basic/Clinical Investigations and Population)
July 2017	Society for Pediatric Anesthesia: letter of intent grant review study section
Oct. 2017	Society for Pediatric Anesthesia: grant review study section
Jan. 2018	Imperial College of London, United Kingdom: ad hoc reviewer for Research and Development and Research Ethics
March 2018	American Heart Association Career Development Award ad hoc reviewer: Career Development Award Population and Clinical
May 2018–present	Founder, Women’s Empowerment and Leadership Initiative (WELI) within the Society for Pediatric Anesthesia
June 2018–present	European Society for Pediatric Research - Near Infrared Spectroscopy Special Interest Group: generate consensus guidelines and statements for the use of NIRS in neonatal care
July 2018	Society for Pediatric Anesthesia: letter of intent grant review study section
Oct. 2018	Society for Pediatric Anesthesia: Young Investigator Award study section
Dec. 2018	Co-Chair of the American Heart Association Career Development Award study section: clinical research

Institutional

Jan. 2016	JHU Dept. of Anesthesiology and Critical Care Medicine StAAR research grant program (Stimulating and Advancing ACCM Research): grant review study section
July 2016	JHU Dept. of Anesthesiology and Critical Care Medicine StAAR research grant program (Stimulating and Advancing ACCM Research): grant review study section
Nov. 2016	JHU Dept. of Anesthesiology and Critical Care Medicine StAAR research grant program (Stimulating and Advancing ACCM Research): grant review study section
June 2017	JHU Dept. of Anesthesiology and Critical Care Medicine StAAR research grant program (Stimulating and Advancing ACCM Research): grant review study section
Dec. 2017	JHU Dept. of Anesthesiology and Critical Care Medicine StAAR research grant program (Stimulating and Advancing ACCM Research): grant review study section
June 2018	JHU Dept. of Anesthesiology and Critical Care Medicine StAAR research grant program (Stimulating and Advancing ACCM Research): grant review study section
Dec. 2018	JHU Dept. of Anesthesiology and Critical Care Medicine StAAR research grant program (Stimulating and Advancing ACCM Research): grant review study section

Institutional Administrative Appointments

7/1/04–6/30/05	Johns Hopkins Department of Pediatrics Morbidity and Mortality Review Committee
2/1/15–11/1/15	Co-leader for committee on the Johns Hopkins Dept. of Anesthesiology and Critical Care Medicine Biomedical Discovery Strategic Initiative Investments
5/1/15–12/1/15	Pediatric Neurosurgery Division Chief search committee, member
9/1/15–12/30/16	Work-Life Balance Pilot Project committee, co-Chair
11/18/15–present	Johns Hopkins Anesthesiology and Critical Care Medicine Research committee, member

Professional Societies

2002–2012	American Academy of Pediatrics, member
2005–present	American Society of Anesthesiologists, member
2007–2013	Society of Critical Care Medicine, member
2008–present	Society for Pediatric Anesthesia (SPA): 2008–present Member 2016–present Board of Directors 2018–present Founder of the Women’s Empowerment and Leadership Initiative (WELI) within SPA
2008–present	International Anesthesia Research Society, member

2008–2011	Society for Cardiovascular Anesthesiologists, member
2011–present	Pediatric Neurocritical Care Research Group, member
2011–2013	Society of Critical Care Anesthesiologists, member
2014–present	American Heart Association, member
2016–present	Pediatric Academic Societies, member
2017–present	Association of University Anesthesiologists, member

Conference Organizer, Session Chair

International, National

Oct. 2012	International Assembly for Pediatric Anesthesia: Research committee, abstract reviewer, poster session moderator for “Neurosciences.” Washington D.C. 10/10/12–10/12/12.
March 2012	Society for Pediatric Anesthesia: Research committee, abstract reviewer. Las Vegas, NV. 3/14/12–3/17/12.
March 2014	Society for Pediatric Anesthesia: Research committee, abstract reviewer, poster session moderator for “Safety and Outcomes.” Ft. Lauderdale, FL. 3/7/14–3/9/14.
5/1/16–3/6/17	Society for Pediatric Anesthesia conference planning committee: apprentice to Committee Chair

Institutional

Dec. 2012	JHU Department of Anesthesiology and Critical Care Medicine 14 th Annual Research Day: faculty organizer, abstract reviewer. Baltimore, MD. 12/10/12–12/11/12.
Dec. 2013	JHU Department of Anesthesiology and Critical Care Medicine 15 th Annual Research Day: poster session moderator for “Stroke and Ischemia.” Baltimore, MD. 12/4/13.

Consultantships

Sept. 2016	Medtronic advisory board participant for near-infrared spectroscopy monitoring techniques
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RECOGNITION

Awards, Honors

2001	Henry Strong Dennison Research Award
2002	The W. Barry Wood Student Research Award
2009	Johns Hopkins Anesthesiology Critical Care Medicine Research Award, 1 st place
2009	The Foundation for Anesthesia Education and Research/American Society of Critical Care, Anesthesiologists/Hospira Physician Scientist Award
2010	The Society for Pediatric Anesthesia Young Investigator Award, 2 nd place
2010	Johns Hopkins Anesthesiology/Critical Care Medicine Research Award, 1 st place
2017	Best Reviewer for the journal <i>Anesthesia and Analgesia</i>
2018	The Dick Traystman Investigator Award from the Hershey Developmental Brain Injury Conference

Invited Talks – Regional

Visiting Professorships

2/17/10	Cerebrovascular autoregulation after hypoxic-ischemic brain injury. Kennedy Krieger Institute. Baltimore, MD.
4/10/14	Cerebral autoregulation and neuronal cell death after pediatric brain injury. University of Maryland Medical Center Grand Rounds. Baltimore, MD.

Other Invited Lectures

- 2/22/11 Non-invasive cerebral autoregulation monitoring after pediatric hypoxic brain injury. Johns Hopkins Neurocritical Care Seminar. Baltimore, MD.
- 6/8/11 Translational model of pediatric cerebral hypoxia. Johns Hopkins Pediatric Neurology Grand Rounds. Baltimore, MD.
- 6/10/11 Cerebrovascular autoregulation after pediatric cardiac arrest and therapeutic hypothermia. Johns Hopkins Anesthesiology and Critical Care Medicine 2011 Biennial Program. Baltimore, MD.
- 7/12/11 Autoregulation in the neonate. Johns Hopkins Neuro-Intensive Care Nursery Foundations Seminar. Baltimore, MD.
- 1/24/12 Pediatric sedation and airway management. Sinai Hospital, Department of Pediatrics. Baltimore, MD.
- 3/6/12 Identifying blood pressure goals in infants with hypoxic brain injuries. Scientific Seminar and Dedication for the Johns Hopkins Sutland/Pakula Family Newborn Critical Care Center. Baltimore, MD.
- 10/9/12 Neurologic injury after hypoxia-ischemia and therapeutic hypothermia. JHU Neurocritical Care Unit Research Seminar. Baltimore, MD.
- 10/26/12 Cerebrovascular autoregulation and pediatric hypoxic brain injuries. JHU PICU Research Seminar. Baltimore, MD.
- 1/31/13 Translational research: cerebrovascular autoregulation. Presentation to the Dean of the Johns Hopkins University School of Medicine. Baltimore, MD.
- 6/28/13 Long-term effects of anesthesia. The 2013 Bladder Exstrophy Conference. Baltimore, MD.
- 4/30/14 Neonatal autoregulation. Johns Hopkins University Neuro-Intensive Care Foundations Seminar. Baltimore, MD.
- 10/30/14 Neuromonitoring today and tomorrow. Third Regional District of Columbia/Maryland/Virginia Neonatal-Perinatal Symposium. Bethesda, MD.
- 1/9/15 Adverse Effects of Therapeutic Hypothermia in a Piglet Model of Neonatal Hypoxic Brain Injury. Johns Hopkins University Department of Pathology Research Seminar. Baltimore, MD.
- 2/23/15 Neuronal cell death after therapeutic hypothermia. Johns Hopkins University Department of Molecular Biology and Immunology Research Seminar. Baltimore, MD.
- 2/11/16 Cerebral autoregulation and cell death after hypoxic brain injury. Johns Hopkins Medicine Anesthesiology and Critical Care Medicine Inaugural Discovery Rounds. Baltimore, MD.
- 9/26/16 The search for neuroprotection blood pressures. Johns Hopkins University Neonatal Intensive Care Nursery Foundations Conference. Baltimore, MD.

Invited Talks – National

Visiting Professorships

- 1/3/13 Pediatric neurosurgical emergencies: traumatic brain injury. University of Louisville residency education lecture. Louisville, KY.
- 1/4/13 Live snapshots of the brain: real-time autoregulation monitoring. University of Louisville Grand Rounds. Louisville, KY.
- 4/11/13 Cerebrovascular autoregulation monitoring in neurocritical care settings. Neurocritical Care Research Seminar. Northwestern University Feinberg School of Medicine, Lurie Children’s Hospital. Chicago, IL.
- 4/17/13 Cell death mechanisms after rewarming from therapeutic hypothermia. Pediatric ICU Research Seminar. University of Pennsylvania, Children’s Hospital of Philadelphia. Philadelphia, PA.
- 4/18/13 Cerebral autoregulation after hypoxic brain injuries. University of Pennsylvania, Children’s Hospital of Philadelphia Grand Rounds. Philadelphia, PA.
- 5/1/13 Cerebrovascular autoregulation during anesthesia and in critical care medicine. Harvard University. Boston Children’s Hospital Grand Rounds. Boston, MA.
- 8/7/13 Cerebrovascular autoregulation monitoring in pediatric anesthesia and critical care medicine. Ohio State University, Nationwide Children’s Hospital Grand Rounds. Columbus, OH.
- 11/20/13 Invasive and non-invasive continuous cerebrovascular autoregulation monitoring in critically ill patients. University of Washington Grand Rounds. Seattle, WA.
- 11/20/13 Neuronal and oligodendrocyte injury after hypoxic brain injuries and therapeutic hypothermia. University of Washington, Seattle Research Institute. Seattle, WA.

- 2/22/16 Neuroprotection after brain injury. University of Colorado Department of Anesthesiology Grand Rounds. Denver, CO.
- 6/4/18 Neonatal autoregulation: hypoxic-ischemic encephalopathy and prematurity. University of California San Francisco Departments of Pediatric Anesthesiology and Neonatology. San Francisco, CA.
- 6/5/18 Experimental autoregulation monitoring: translation from a piglet model to clinical studies. University of California San Francisco Physiological Signals Monitoring Lab. San Francisco, CA.
- 6/5/18 Cell death mechanisms in a preclinical model of hypoxic-ischemic encephalopathy. University of California San Francisco Departments of Neonatology, Pediatric Critical Care, and Neurology. San Francisco, CA.
- 6/6/18 Real-time autoregulation monitoring. Grand Rounds at the University of California San Francisco Department of Anesthesiology. San Francisco, CA.
- 6/6/18 White matter injury after neonatal brain hypoxia. University of California San Francisco Department of Anesthesiology. San Francisco, CA.

Other Invited Lectures

- 3/21/09 Opiate and benzodiazepine withdrawal in an infant with apnea and renal hypertension. Society for Pediatric Anesthesia. Jacksonville, FL.
- 4/17/10 Cerebral blood flow and cerebrovascular autoregulation after pediatric cardiac arrest and hypothermia. Society for Pediatric Anesthesia. San Antonio, TX.
- 10/12/11 Intracranial hypertension, cardiovascular compromise, and anesthesia. Society of Pediatric Anesthesia. Chicago, IL.
- 10/12/11 Cerebral autoregulation and pediatric hypoxic brain injuries. Society of Critical Care Anesthesiologists. Chicago, IL.
- 5/11/13 Alterations in cerebral autoregulation after severe traumatic brain injury. Johns Hopkins Traumatic Brain Injury National Conference: Biomarkers in Brain Trauma. Baltimore, MD.
- 3/9/14 Resuscitation science update. Society for Pediatric Anesthesia. Ft. Lauderdale, FL.
- 10/22/15 Trauma and Traumatic Brain Injury: When Trauma is No Accident. The Society for Pediatric Anesthesiology. San Diego, CA.
- 3/1/16 Current and future use of NIRS cerebral oximetry monitoring. ECMO and the Advanced Therapies for Respiratory Failure. 32nd Annual Children's National Symposium. Keystone, CO.
- 4/1/16 PALS Resuscitation Update (The American Heart Association Guidelines). The Society for Pediatric Anesthesiology. Colorado Springs, CO.
- 6/15/16 Cell death continuum and endoplasmic reticulum stress after neonatal hypoxia-ischemia and therapeutic hypothermia. Keystone Symposia on Molecular and Cellular Biology: Common Mechanisms of Neurodegeneration. Keystone, CO.
- 9/8/16 Time domain NIRS autoregulation monitoring: applications for pediatric critical care and perioperative medicine. International Medtronic Global INVOS Regional Oximetry Advisory Board and Educational Summit. Minneapolis, MN.
- 10/20/17 Moderator for Neurons, needles, and networks: modulation through the ages. Society for Pediatric Anesthesia. Boston, MA.
- 10/21/17 Foundation for Anesthesia Education and Research New Investigators: New leaders of anesthesia research. American Society of Anesthesiologists. Boston, MA.
- 10/5/18 The brain: cerebral autoregulation and vasculopathy in the PICU. 25th Pediatric Critical Care Colloquium. Baltimore, MD.
- 10/13/18 Management of mediastinal masses. Society for Pediatric Anesthesia. San Francisco, CA
- 10/16/18 Anesthetic considerations for neonates: term and preterm. American Society of Anesthesiologists. San Francisco, CA

Invited Talks – International

Visiting Professorships

- 10/4/17 Cerebral autoregulation and neuroprotection after pediatric and neonatal hypoxic brain injury. Cork University Hospital. Wilton, Cork, Ireland.

- 10/10/17 Neurological vasoreactivity after pediatric brain hypoxia. Brain Physics Seminar. University of Cambridge. Cambridge, United Kingdom.
- 10/12/17 Does autoregulation depend on age? From neonates to the elderly. Brain Physics Seminar. University of Cambridge. Cambridge, United Kingdom.
- 9/28/18 Pediatric vasoreactivity and autoregulation monitoring. Hospital for Sick Children, University of Toronto. Toronto, Canada.
- 11/7/18 Neonatal brain injury. MITERA Hospital. Athens, Greece.
- 11/19/18 Cerebrovascular autoregulation. Showa University School of Medicine. Tokyo, Japan.

Other Invited Lectures

- 2/26/15 Neuronal and glial cell death after pediatric cardiac arrest. The Inaugural Indo-U.S. Translational Neuroscience Symposium: Biomarker Discovery and Validation. Baltimore, MD.
- 5/1/16 Critical Blood Pressure Threshold Following Cardiopulmonary Arrest: Clinical and Translational Studies. Pediatric Academic Societies. Baltimore, MD.
- 5/5/18 Proteasome insufficiency in white matter injury from neonatal brain hypoxia. Pediatric Academic Societies. Toronto, Canada.
- 9/11/18 Cerebral vasoreactivity in experimental models. Intensive Care Monitoring conference. Cambridge, United Kingdom.

OTHER PROFESSIONAL ACCOMPLISHMENTS

Additional abstracts and posters not listed in the mentee section

Massaro AN, du Plessis A, **Lee JK**, Vezina G, Al-Shargabi T, Wang Y, Govindan R. Dysfunctional autoregulation and brain injury in newborns with hypoxic ischemic encephalopathy undergoing therapeutic hypothermia. Pediatric Academic Societies. May 6–9, 2017. San Francisco, CA.

Snyder E, Chavez-Valdez R, Perin J, Northington FJ, Huisman TAGM, **Lee JK**, Tekes A. Resistive index values measured by head ultrasound in neonates cooled for hypoxic ischemic injury. Pediatric Academic Societies. May 5-8, 2018. Toronto, Canada.

Additional Research Projects at Johns Hopkins University

- 1999–2000 Profiles of Children Evaluated for Sexual Abuse and Recommendations for Treatment.
Principal Investigator: Diane Becker, Sc.D.
Role: Research trainee
J.K. Kellogg Foundation and support from the Johns Hopkins School of Medicine Dean's Office
Aim: To examine risk factors for sexual abuse, factors affecting success of treatment, and outcomes of child survivors of sexual abuse.
- 2000–2002 STIs, Sexual Networks, and Other High-Risk Practices Among Adolescents.
Principal Investigator: Jonathan Ellen, M.D.
Role: Research trainee
Aim: To examine the role of sexual networking in the spread of sexually transmitted infections among urban youth.
- 2000–2004 Improving Hepatitis B Vaccination Rates and Acceptance Among Homeless Families and Children.
Principal Investigator: Kathleen Schwarz, M.D.
R01 DA13743
Role: Research trainee
Aim: To develop and test an educational tool designed to increase hepatitis B education and vaccine acceptance among homeless families and children.
- 2005–2007 Variation in Managing Pediatric Traumatic Brain Injury

Principal Investigator: Donald “Hal” Shaffner, M.D.

The Sam Hulett Fund

Role: Research trainee

Aim: To explore differences in treatment thresholds among physicians based on clinical variables and to identify areas of treatment controversy in pediatric traumatic brain injury.

International Medicine

2005, 2006 Haiti: Established three diagnostic laboratories in impoverished areas using a grant from the Dorothea Hauss Ross Foundation. Trained Haitian health care workers and laboratory technicians. Provided direct medical care. Collected and delivered over \$100,000 in medical supplies.

2004 Guyana: Trained Guyanese health care workers. Provided direct medical care to children living in impoverished areas. Collected and delivered over \$100,000 in medical supplies.