

**CURRICULUM VITAE**  
**The Johns Hopkins University School of Medicine**

Jochen Steppan, MD, DESA, D.ABA, FAHA, FASA

October 1, 2024

**DEMOGRAPHIC AND PERSONAL INFORMATION**

**Current Appointments**

University

2013 – 2019 Assistant Professor, Department of Anesthesiology and Critical Care Medicine,  
Johns Hopkins University School of Medicine

2019 – present Associate Professor, Department of Anesthesiology and Critical Care Medicine,  
Johns Hopkins University School of Medicine

Hospital

2013 – present Attending Physician, Johns Hopkins Hospital

Other

2015 – present Director of Perioperative Medicine High Risk Cardiovascular Disease, Department of Anesthesiology and  
Critical Care Medicine, Johns Hopkins University School of Medicine, Baltimore, MD

**Personal Data**

Business Address Division of Adult Cardiothoracic Anesthesia  
Division of Pediatric Anesthesia  
Anesthesiology and Critical Care Medicine  
Sheikh Zayed Tower 6208C  
1800 Orleans Street  
Baltimore, MD 21287

Tel 410 955 7519

Fax 410 955 0994

E-mail J.Steppan@jhmi.edu

**Education and Training**

Undergraduate

1999 Abitur, Johann-Peter-Hebel Gymnasium, Schwetzingen, Germany  
(German General Qualification Exam for University Entrance)

2000 Civilian service, German Cancer Research Center, Heidelberg, Germany

2021 Management Development Certificate, Carey Business School, Executive Education, Baltimore, MD

Doctoral/graduate

2007 Graduate, Medical School, Ruprecht-Karls University, Heidelberg, Germany

2007 Medical Thesis (cum laude) on Heart Rate Variability and Electroencephalographic Changes during  
Acupuncture, Department of Anesthesiology, Ruprecht-Karls University, Heidelberg, Germany

2008 Educational Commission for Foreign Medical Graduates Certificate (ECFMG Cert. # 0-689-040-4)

Postdoctoral

2007 – 2008 Resident, Anesthesiology, Heidelberg University Hospital, Heidelberg, Germany

2008 – 2009 Intern, Internal Medicine, University of Maryland Medical Center, Baltimore, MD

2009 – 2012 Resident, Anesthesiology and Critical Care Medicine, Johns Hopkins Hospital, Baltimore, MD

- 2012 – 2013 Fellowship, Adult Cardiothoracic Anesthesiology, Johns Hopkins Hospital, Baltimore, MD  
2013 – 2014 Fellowship, Pediatric Cardiac Anesthesiology, Johns Hopkins Hospital, Baltimore, MD

### Professional Experience

- 2013 – 2019 Assistant Professor, Anesthesiology and Critical Care Medicine, Johns Hopkins University School of Medicine, Baltimore, MD  
2015 – present Director of Perioperative Medicine High Risk Cardiovascular Disease, Johns Hopkins University School of Medicine, Baltimore, MD  
2019 – present Associate Professor, Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University School of Medicine

### PUBLICATIONS

#### Original Research [OR]

1. White AR, Ryoo S, Li D, Champion H, **Steppan J**, Wang D, Nyhan D, Shoukas A, Hare JM, Berkowitz DE. Knock-down of Arginase 1 Restores Nitric Oxide Signaling in the Vasculature of Old Rats. *Hypertension*. 2006;47(2):245-51  
CORRESPONDENCE / COMMENT: Zhang WZ, Kaye DM. Does Arginase Activity in Vitro Represent That in Vivo? *Hypertension*. 2006;48(4):E14
2. **Steppan J**, Ryoo S, Schuleri KH, Gregg C, Hasan RK, White AR, Bugaj LJ, Khan M, Santhanam L, Nyhan D, Shoukas A, Hare JM, Berkowitz DE. Arginase modulates myocardial contractility by a nitric oxide synthase 1 dependent mechanism. *Proc Natl Acad Sci USA*. 2006; 103(12):4759-4764
3. Streitberger K\*, **Steppan J**\*, Maier C, Hill H, Backs J, Plaschke K. Effects of verum acupuncture compared to placebo acupuncture on quantitative EEG and heart rate variability in healthy volunteers. *J Altern Complement Med*. 2008;14(5):505-13 \*joint first authorship
4. Kayhan N, Funke B, Conzelmann LO, Winkler H, Hofer S, **Steppan J**, Schmidt H, Bardenheuer H, Vahl CF, Weigand MA. The Adenosine deaminase inhibitor EHNA decreases intestinal permeability and protects against experimental sepsis. *Crit Care*. 2008;13,12(5):R125
5. Hofer S\*, **Steppan J**\*, Wagner T, Funke B, Lichtensein C, Martin E, Graf BM, Bierhaus A, Weigand MA. Central sympatholytics prolong survival in experimental sepsis. *Crit Care*. 2009;6,13(1):R11 \*joint first authorship  
CORRESPONDENCE / COMMENT: Ulloa L, Deitch EA. Neuroimmune perspective in sepsis. *Crit Care*. 2009;13(2):133
6. Hofer S, Brenner T, Bopp C, **Steppan J**, Lichtenstern C, Weitz J, Bruckner T, Martin E, Hoffmann U, Weigand MA. Cell death serum biomarkers are early predictors for survival in severe septic patients with hepatic dysfunction. *Crit Care*. 2009;13(3):R93  
CORRESPONDENCE / COMMENT: Bantel H, Schulze-Osthoff K. Cell death in sepsis: a matter of how, when, and where. *Crit Care*. 2009;13(4):173
7. Brenner T, Rosenhagen C, **Steppan J**, Lichtenstern C, Weitz J, Bruckner T, Martin E, Hoffmann U, Weigand MA, Hofer S. Redox responses in patients with severe sepsis and septic shock: High correlation of TRX1 (Thioredoxin-1) and MIF (Macrophage Migration Inhibitory Factor) plasma levels. *Mediators of Inflammation*. 2010;2010:985614
8. Gregg C\*, **Steppan J**\*, Phan A, Champion H, Nyhan D, Shoukas A, Hare JM, Barouch L, Berkowitz DE. Beta2 AR - coupled PI3 kinase constrains cAMP/PKA- dependent increase in cardiac inotropy through cAMP- dependent PDE activation. *Anesth Analg*. 2010;111(4):870-7 \*joint first authorship
9. Brenner T, Hofer S, Rosenhagen C, **Steppan J**, Lichtenstern C, Weitz J, Bruckner T, Martin E, Hoffmann U, Weigand MA. Macrophage Migration Inhibitory Factor (MIF) and Manganese Superoxide Dismutase (MnSOD) are early predictors for survival in septic patients. *J Surg Res*. 2010;164(1):e163-71
10. **Steppan J**, Hofer S, Funke B, Brenner T, Henrich M, Martin E, Weitz J, Hofmann U, Weigand MA. Sepsis and Major Abdominal Surgery Lead to Flaking of the Endothelial Glycocalix. *J Surg Res*. 2011;165(1):136-41
11. Mustafa AK, Sikka G, Gazi SK, **Steppan J**, Jung SM, Bhunia AK, Barodka VM, Gazi FK, Barrow RK, Wang R, Amzel LM, Berkowitz DE, Snyder H. Hydrogen Sulfide as Endothelial-Derived Hyperpolarizing Factor Sulfhydrates Potassium Channels. *Circ Res*. 2011;109(11):1259-68  
CORRESPONDENCE / COMMENT: Edwards G, Félétou M, Weston AH. Hydrogen Sulfide as an Endothelium-Derived Hyperpolarizing factor in rodent Mesenteric Arteries. *Circ Res*. 2012;110(1):E13-4
12. Khan M\*, **Steppan J**\*, Schuleri K, Ryoo S, Taday E, Bugaj L, Berkowitz T, Nyhan D, Shoukas A, Berkowitz DE. Upregulation of Arginase II contributes to decreased age related myocardial reserve. *Eur J Appl Physiol*. 2012;112(8):2933-41 \*joint first authorship

13. Segal R, Hannan JL, Lu X, Kutlu O, Burnett AL, Champion HC, Kim JH, **Steppan J**, Berkowitz DE, Bivalacqua TJ. Chronic Oral Administration of the Arginase Inhibitor 2(S)-amino-6-boronohexanoic acid (ABH) Improves Erectile Function in Aged Rats. *J Androl.* 2012; 33(6):1169-75
14. **Steppan J\***, Tran H\*, Benjo AM, Pellakuru L, Barodka V, Ryoo S, Nyhan SM, Lussman C, Gupta G, White AR, Daher JP, Shoukas AA, Levine BD, Berkowitz DE. Alagebrium in combination with exercise ameliorates age associated ventricular and vascular stiffness. *Exp Gerontol.* 2012;47(8):565-72 \*joint first authorship
15. **Steppan J**, Nyhan SM, Sikka G, Uribe J, Ahuja A, White AR, Shoukas A, Berkowitz DE. Vasopressin-mediated Enhancement of Adrenergic Vasoconstriction Involves Both the Tyrosine Kinase and the Protein Kinase C Pathways. *Anesth Analg.* 2012;115(6):1290-5
16. Herzer KR, Mirrer M, Xie Y, **Steppan J**, Li M, Jung C, Cover R, Doyle PA, Mark Patient Safety Reporting Systems: Sustained Quality Improvement Using a Multidisciplinary Team and “Good Catch” Awards. *Jt Comm J Qual Patient Saf.* 2012;38(8):339-47 [SI/QI]
17. Sikka G, Miller KL, **Steppan J**, Pandey D, Jung SM, Fraser CD 3rd, Ellis C, Ross D, Vandegaer K, Bedja D, Gabrielson K, Walston JD, Berkowitz DE, Barouch LA. Interleukin 10 knockout frail mice develop cardiac and vascular dysfunction with increased age. *Exp Gerontol.* 2013;48(2):128-35
18. Jung SM, Jandu S, **Steppan J**, Belkin A, An SS, Park A, Choi EY, Nyhan D, Butlin M, Viegas K, Avolio AP, Berkowitz DE, Santhanam L. Increased Tissue Transglutaminase Activity Contributes to Central Vascular Stiffness in eNOS Knockout Mice. *Am J Physiol Heart Circ Physiol.* 2013;305(6):H803-10
19. Sikka G, Pandey D, Bhuniya AK, **Steppan J**, Armstrong D, Santhanam L, Nyhan D, Berkowitz DE. Contribution of arginase activation to vascular dysfunction in cigarette smoking. *Atherosclerosis.* 2013;231(1):91-4
20. Fitch ZW, Debesa O, Ohkuma R, Duquaine D, **Steppan J**, Schneider EB, Whitman GJ. A protocol-driven approach to early extubation after heart surgery. *J Thorac Cardiovasc Surg.* 2014;147(4):1344-50 [SI/QI]
21. **Steppan J**, Sikka G, Jandu S, Barodka V, Haluska MK, Flavahan N, Belkin AM, Nyhan D, Butlin M, Avolio A, Berkowitz DE, Santhanam L. Exercise, vascular stiffness, and tissue transglutaminase. *J Am Heart Assoc.* 2014;3(2):e000599  
 EDITORIAL: Kang JJ, Bodary BF. How Old are Your Arteries? Exercise-Mediated Protection From Age-Associated Vascular Stiffness. *J Am Heart Assoc.* 2014;3(2)
22. Maxwell BG, **Steppan J**, Cheng A. Complications of Catheter-Based Electrophysiology Procedures in Adults with Congenital Heart Disease: A National Analysis. *J Cardiothoracic Vasc Anesth.* 2015;29(2):258-64  
 EDITORIAL: Peruzzi M, Biondi-Zoccai G, Marullo AG, Frati G. There’s no Lightning Without a Storm: Complications of Electrophysiology Procedures in Grown-up Congenital Heart Disease. *J Cardiothorac Vasc Anesth.* 2015;29(2):255-7
23. Sikka G, Hussman GP, Pandey D, Cao S, Hori D, Park JT, **Steppan J**, Kim JH, Barodka V, Myers AC, Santhanam L, Nyhan D, Halushka MK, Koehler RC, Snyder SH, Shimoda LA, Berkowitz DE. Melanopsin mediates light-dependent relaxation in blood vessels. *Proc Natl Acad Sci USA.* 2014;111(50):17977-82
24. Kuo MM, Barodka V, Abraham TP, **Steppan J**, Shoukas AA, Butlin M, Avolio A, Berkowitz DE, Santhanam L. Measuring ascending aortic stiffness in vivo in mice using ultrasound. *J Vis Exp.* 2014;2(94)
25. **Steppan J**, Sikka G, Hori D, Nyhan D, Berkowitz DE, Gottschalk A, Barodka V. Seeking a blood pressure-independent measure of vascular properties. *Hypertens Res.* 2016;39(1):27-38
26. Oh YJ, Paul VC, **Steppan J**, Sikka G, Bead VR, Nyhan D, Levine BD, Berkowitz DE, Santhanam L. Role of Tissue Transglutaminase in age-associated ventricular stiffness. *Amino Acids.* 2016 July 20
27. **Steppan J**, Tran HT, Bead VR, Oh YJ, Sikka G, Bivalacqua T, Burnett AL, Berkowitz DE, Santhanam L. Arginase Inhibition Reverses Endothelial Dysfunction, Pulmonary Hypertension, and Vascular Stiffness in Transgenic Sickle-Cell Mice. *Anesth Analg.* 2016 Sep;123(3):665-8
28. Natarajan N, Hori D, Flavahan S, **Steppan J**, Flavahan NA, Berkowitz DE, Plutznik JL. Microbial short chain fatty acid metabolites lower blood pressure via endothelial G-protein coupled receptor 41. *Physiol Genomics* 2016 Sep 23
29. Obata Y, Mizogami M, Singh S, Nyhan D, Berkowitz DE, **Steppan J**, Barodka V. The Effects of Hemodynamic Changes on Pulse Wave Velocity in Cardiothoracic Surgical Patients. *Biomed Res Int* 2016;2016:9640457
30. Obata Y, Mizogami M, Nyhan D, Berkowitz DE, **Steppan J**, Barodka V. Pilot Study: Estimation of Stroke Volume and Cardiac Output from Pulse Wave Velocity. *PLoS One*, 2017 Jan 6;12(1):e0169853
31. **Steppan J**, Bergman Y, Viegas K, Armstrong D, Tan Siqi, Wang Huilei, Melucci S, Hori D, Yong S, Barreto SF, Isak A, Jandu S, Flavahan N, Butlin M, An SS, Avolio A, Berkowitz DE, Halushka M, Santhanam L. Tissue Transglutaminase Modulates Vascular Stiffness and Function through Crosslinking-Dependent and Crosslinking-Independent Functions. *J Am Heart Assoc.* 2017 Feb 3;6(2). pii: e004161

32. Obata Y, Ong QJ, Magruder JT, Grichkevitch H, Berkowitz DE, Nyhan D, **Steppan J**, Barodka V. Noninvasive Assessment of the Effect of Position and Exercise on Pulse Arrival to Peripheral Vascular Beds in Healthy Volunteers. *Front Physiol.* 2017 Feb 6;8:47.
33. Hori D, Dunkerly-Eyring B, Nomura Y, Biswas D, **Steppan J**, Henao-Mejia J, Adachi H, Santhanam L, Berkowitz DE, Steenbergen C, Flavell RA, Das S. miR-181b regulates vascular stiffness age dependently in part by regulating TGF-beta signaling. *PLoS One.* 2017 Mar 21;12(3):e0174108.
34. Obata Y, Ruzankin P, Ong QJ, Berkowitz DE, Berger RD, **Steppan J**, Barodka V. The impact of posture on the cardiac depolarization and repolarization phases of the QT interval in healthy subjects. *J Electrocardiol.* 2017 Mar 12. pii: S0022-0736(17)30065-1.
35. Obata Y, Mizogami M, Singh S, Nyhan D, Berkowitz DE, **Steppan J**, Barodka V. Ejection time: influence of hemodynamics and site of measurement in the arterial tree. *Hypertens Res.* 2017 Mar 30.
36. Barreto OS, Hori D, Nomura Y, Yun X, Jiang H, Yong H, Chen J, Paek S, Pandey D, Sikka G, Bhatta A, Gillard A, **Steppan J**, Kim JH, Adachi J, Barodka V, Romer L, An SS, Shimoda LA, Santhanam L, Berkowitz DE. Opsin 3 and 4 mediate light-induced pulmonary vasorelaxation that is potentiated by G-protein receptor kinase 2 inhibition. *Am J Physiol Lung Cell Mol Physiol.* 2017 Sep 7:ajplung.00091.2017.
37. Obata Y, Ruzankin P, Gottschalk A, Nyhan D, Berkowitz DE, **Steppan J**, Barodka V. Pulse wave travel distance as a novel marker of ventricular-arterial coupling. *Heart and Vessels.* 2018 Mar;33(3):279-290.
38. Tripathi A, Obata Y, Ruzankin P, Askaryar N, Berkowitz DE, **Steppan J**, Barodka V. A pulse wave velocity based method to assess the mean arterial blood pressure limits of autoregulation in peripheral arteries. *Front Physiol* 2017 Nov 2;8:855
39. Obata Y, Ruzankin P, Berkowitz DE, **Steppan J**, Barodka V. Difference between ejection times measured at two different peripheral locations as a novel marker of vascular stiffness. *PLoS One* 2017 Nov 29;12(11):e0187781
40. **Steppan J**, Diaz-Rodriguez N, Barodka VM, Nyhan D, Pullins E, Houston T, Damico RL, Mathai SC, Hassoun PM, Berkowitz DE, Maxwell BG, Kolb TM. Focused review of the perioperative care of patients with pulmonary hypertension and proposal of a perioperative pathway for those patients. *Cureus* 2018 Jan 15;10(1):e2072. [SI/QI]
41. Obata Y, Barodka V, Berkowitz DE, Gottschalk A, Hogue CW, **Steppan J**. The relationship between the ambulatory arterial stiffness index and the lower limit of cerebral autoregulation during cardiac surgery. *J Am Heart Assoc.* 2018 Feb 8;7(4). pii: e007816
42. **Steppan J**, Wang H, Bergman Y, Rauer MJ, Tan S, Jandu S, Nandakumar K, Barreto-Ortiz S, Cole RN, Boronina TN, Zhu W, Halushka MK, An SS, Berkowitz DE, Santhanam L. Lysyl oxidase-like 2 (LOXL2) depletion is protective in age-associated vascular stiffening. *Am J Physiol Heart Circ Physiol.* 2019 Jul 1;317(1):H49-H59  
EDITORIAL: Balasubramanian P, Csiszar A. Lysyl oxidases as driving forces behind age-related macrovascular rigidity. *Am J Physiol Heart Circ Physiol.* 2019 May 17
43. **Steppan J**, Jandu S, Wang H, Savage W, Narayanan R, Nandakumar K, Santhanam L. Commonly used mouse strains have distinct vascular properties. *Hypertens Res.* 2020 May 14
44. **Steppan J**, Jandu S, Savage W, Wang H, Kang S, Narayanan R, Nyhan D, Santhanam L. Restoring blood pressure in hypertensive mice fails to fully reverse vascular stiffness. *Front Physiol.* 2020 Jul 21;11:824
45. Fukunishi T, Ong CS, He YJ, Inoue T, Zhang H, **Steppan J**, Matsushita H, Johnson J, Santhanam L, Hibino N. Fast-degrading TEVGs Lead to Increased ECM Cross-linking Enzymes Expression. *Tissue Eng Part A.* 2021 Feb 18
46. Padiyath A, Lo BD, Ong CS, Goswami D, Steppan DA, Frank SM, **Steppan J**. Red blood cell storage duration and peri-operative outcomes in paediatric cardiac surgery. *Vox Sang.* 2021 Mar 24
47. Wang H, Poe A, Pak L, Nandakumar K, Jandu S, **Steppan J**, Löser R, Santhanam L. An in situ activity assay for lysyl oxidases. *Commun Biol.* 2021 Jul 5;4(1):840
48. Ellassal A, **Steppan J**, Charania S, Santhanam L, Singh I, Heerdt PM. Pressure-based estimation of right ventricular ejection fraction: Validation as a clinically relevant target for drug development in a rodent model of pulmonary hypertension. *J Pharmacol Toxicol Methods.* 2021 Jul 7;112:107102
49. Hassan HJ, Houston T, Balasubramanian A, Simpson CE, Damico RL, Mathai SC, Hassoun PM, **Steppan J**, Leary PJ, Kolb TM. A novel approach to perioperative risk assessment for patients with pulmonary hypertension. *ERJ Open Res.* 2021 Jul 19;7(3):00257-2021 [SI/QI]
50. Wang H, Chen J, Jandu S, Melucci S, Savage W, Nandakumar K, Kang SK, Barreto-Ortiz S, Poe A, Rastogi S, Bauer M, **Steppan J**, Santhanam L. Probing tissue transglutaminase mediated vascular smooth muscle cell aging using a novel transamidation-deficient TGM2-C277S mouse model. *Cell Death Discov.* 2021 Jul 29;7(1):197
51. Mondal S, Faraday N, Gao WD, Singh S, Hebbar S, Hollander KN, Metkus TS, Goeddel LA, Bauer M, Bush B, Cho B, Cha S, Ibekwe SO, Mladinov D, Roller NS, Lester L, **Steppan J**, Sheinberg R, Hensley NB, Kapoor A, Dodd-O

- JM. Selected transesophageal echocardiographic parameters of left ventricular diastolic function predict length of stay following coronary artery bypass graft – A prospective observational study. *J Clin Med.* 2022 Jul 8;11(14):3980.
52. Philip N, Zhang C, Huetsch J, Yun X, Gadkari M, Harlan R, Graham D, Shimoda L, Le Anne, Simpson C, Santhanam L, Visovatti S, **Steppan J\***, Suresh K\*. Transpulmonary amino acid metabolism in the sugen hypoxia model of pulmonary hypertension. *Pulm Circ.* 2023 Mar 1;13(1):e12205. *Circ Jan 2023.* \*Co-senior authorship
53. **Steppan J**, Nandakumar K, Wang H, Jang R, Smith L, Kang S, Savage W, Rastogi S, Bauer M, Choi R, Brady T, Wodu BP, Scafidi S, Scafidi J, Santhanam L. Neonatal exposure to hypoxia induces early arterial stiffening via activation of lysyl oxidases. *Physiol Rep.* 2023 Apr;11(7):e15656
54. Gavish B, Gottschalk A, Hogue CW, **Steppan J**. Additional predictors of the lower limit of cerebral autoregulation during cardiac surgery. *J Hypertens.* 2023 Sep 15.
55. **Steppan J**, Wang H, Nandakumar K, Poe A, Pak L, Brady T, Gadkari M, Berkowitz DE, Shimoda LA, Santhanam L. LOXL2 inhibition ameliorates pulmonary artery remodeling in pulmonary hypertension. *Am J Physiol Lung Cell Mol Physiol.* 2024 Jul 16.
56. Wang H, Yus MM, Brady T, Choi R, Nandakumar K, Smith L, Jang R, Wodu BP, Almodiel D, Stoddart L, Kim DH, **Steppan J**, Santhanam L. Targeting LOXL2 improves arterial stiffness and function in Angiotensin II-induced hypertension in males but not females. *Am J Physiol Heart Circ Physiol.* 2024 Jul 19.
57. Choi R, Narayanan R, Jandu S, Savage W, Kang S, Abel B, Nandakumar K, Santhanam L, **Steppan J**. Optimization of Wire Myography for Rat Pulmonary Arteries. *Physiol Rep.* 2024 Jan;12(1):e15911.
58. Cruz, N, Pham E, Ali H, Nanavati J, Steppan D, Kolk TM, Thomas AJ, Murphy J, Nyhan S, Grant MC, **Steppan J**. A Systematic Review to Determine if All Cases of Pulmonary Hypertension should Be an Absolute Contraindication to Pregnancy. *Int J Obstetrics Anesth* 2024 Apr 30;59:104210.
59. Zhang S, Tamargo R, Bergman J, Gottschalk A, **Steppan J**. The relationship between intraoperative surrogates of vascular stiffness, cerebral Aneurysms, and surgical outcomes. *J Stroke Cerebrovasc Dis.* 2024 Sep 7;33(11):108003.
60. Wang H, Martinez YM, Brady T, Choi R, Nandakumar K, Smith L, Jang R, Wodu BP, Almodiel JD, Stoddart L, Kim DH, **Steppan J**, Santhanam L. Sex differences and role of lysyl oxidase-like 2 in angiotensin II-induced hypertension in mice. *Am J Physiol Heart Circ Physiol.* 2024 Sep 1;327(3):H642-H659.

#### Review Articles [RA]

1. **Steppan J**, Barodka V, Berkowitz DE, Nyhan D. Systolic Hypertension, Vascular Stiffness and Increased Pulse Pressure in the Aging Cardiovascular System. *Cardiol Res Pract.* 2011;2011:263585
2. **Steppan J**, Nyhan D, Berkowitz DE. Development of Novel Arginase Inhibitors for Therapy of Endothelial Dysfunction. *Front Immunol.* 2013;4:278
3. Maxwell B, **Steppan J**. Postoperative Care of the Adult With Congenital Heart Disease. *Semin Cardiothorac Vasc Anesth.* 2015;19(2) 154-162
4. **Steppan J**, Hogue CW Jr. Cerebral and tissue oximetry. *Best Pract Res Clin Anaesthesiol.* 2014;28(4):429-439
5. Medikonda R, Ong CS, Wadia R, Goswami D, Schwartz J, Wolff L, Hibinio N, Vricella L, Barodka V, **Steppan J**. A Review of Goal-directed Cardiopulmonary Bypass Management in Pediatric Cardiac Surgery. *World J Pediatr Congenit Heart Surg.* 2018 Sep;9(5):565-572  
 EDITORIAL: Angona R. Goal-directed Cardiopulmonary Bypass Management in Pediatric Cardiac Surgery. *World J Pediatr Congenit Heart Surg.* 2018 Sep;9(5):573-574
6. Cheema A, Ibekwe S, Nyhan D, **Steppan J**. When your 35-year-old patient has a sternotomy scar: Anesthesia for adult congenital heart disease patients presenting for non-cardiac surgery. *Int Anesthesiol Clin.* 2018 Fall;56(4):3-20
7. Medikonda R, Ong CS, Wadia R, Goswami D, Schwartz J, Wolff L, Hibinio N, Vricella L, Nyhan D, Barodka V, **Steppan J**. Trends and Recent Updates on Cardiopulmonary Bypass Setup in Pediatric Cardiac Surgery. *J Cardiothorac Vasc Anesth.* 2019 Jan 9
8. Goswami D, DiGiusto M, Wadia R, Barnes S, Schwartz J, Steppan D, Nelson-McMillan K, Ringel R, **Steppan J**. The Use of Bivalirudin in Pediatric Cardiac Surgery and in the Interventional Cardiology Suite. *J Cardiothorac Vasc Anesth.* 2020 Jan 21;S1053-0770(20)30081-1
9. **Steppan J**, Heerdt PM. Pre-operative assessment and peri-operative management of the patient with pulmonary vascular disease. *Clin Chest Med.* 2021 Mar;42(1):133-141
10. Wadia RS, Bernier ML, Diaz-Rodriguez N, Goswami DK, Nyhan SM, **Steppan J**. Update on Perioperative Pediatric Pulmonary Hypertension Management. *J Cardiothorac Vasc Anesth.* 2021 Feb 28;S1053-0770(21)00190-7

11. [Diaz-Rodriguez N](#), [Nyhan SM](#), Kolb TM, **Steppan J**. How We Would Treat Our Own Pulmonary Hypertension if We Needed to Undergo Cardiac Surgery. *J Cardiothorac Vasc Anesth*. 2021 Sep 24;S1053-0770(21)00843-0  
EDITORIAL: Dumitrescu D, Koster A, Erdoes G, Denault AY. Perioperative Management of Pulmonary Hypertension During Cardiac Surgery: A Call for Interdisciplinary Networking. *J Cardiothorac Vasc Anesth*. 2022 Jan 17
12. [Nyhan SM](#), **Steppan J**. Use of Pulmonary Artery Catheters in Cardiac Surgery: Con Argument. *J Cardiothorac Vasc Anesth*. 2022 Sep 30;S1053-0770(22)00725-X
13. Bartels K, Howard-Quijano K, Prin M, Shaefi S, **Steppan J**, Sun EC, Williams B, Fox AA, Namuyonga J, Shaw AD, Vavilala MS, Sessler DI. Meeting Report: First Cardiovascular Outcomes Research in Perioperative Medicine Conference. *Anesth Analg*. 2023 Feb 1;136(2):418-420
14. Moreno-Duarte I, [Parikh RB](#), Paquin J, **Steppan J**, Spaeth JP, Nasr VG, Mitnacht AJC, Mossad EB. Selected 2023 Highlights in Congenital Cardiac Anesthesia. *J Cardiothorac Vasc Anesth*. 2024 Mar 28
15. Gavish B, **Steppan J**. An illustrated explanation of the lower limit of cerebral autoregulation (LLA) and the clinical significance of its monitoring during cardiac surgery. *In Press Med Res Arch* 2024

#### Case Reports [CR]

1. **Steppan J**, Shields J, Lebron R. Pheochromocytoma presenting as acute heart failure leading to cardiogenic shock and multi-organ failure. *Case Report Med*. 2011; 2011:596354
2. [Suffredini G](#), [Diaz-Rodriguez N](#), [Chakravarthy K](#), Mathur A, Hayanga HK, Frank SM, Ringel RE, Freiberg S, Barodka VM, **Steppan J**. Anesthetic Management of Pheochromocytoma Resection in Adults with Single Ventricle Physiology. *Cureus*. 2017 Dec 8;9(12):e1928
3. [Nyhan SM](#), Kolb TM, **Steppan J**. Anesthetic techniques for patients with pulmonary hypertension undergoing ophthalmologic procedures: A case series. *J Clin Anesth*. 2021 Mar 2;71:110220
4. [Patel S](#), [Diaz-Rodriguez N](#), **Steppan J**. Perioperative considerations in patients with Vein of Galen Malformations undergoing embolization – A single institution case series. *In Press at J Neuroanesth Crit Care Med*

#### Book Chapters, Monographs [BC]

1. **Steppan J**, Berkowitz DE, Martinez E, Nyhan D.: Chapter 16 - Diastolic heart function and the elderly. Geriatric Anesthesia, by Frederick E. Sieber; McGraw-Hill Professional; 1st edition, 2006, ISBN: 0071463089
2. **Steppan J**, Brady MB, Mitter N.: The Swan Song. Anesthesia Unplugged, by Christopher Gallagher; McGraw-Hill Professional; 2nd edition, 2012, ISBN: 0071767177
3. **Steppan J**, Mitter N.: Defibrillation. The 5-minute anesthesia consult, by Nina Singh-Radcliff; Wolters Kluwer Health/Lippincott Williams & Wilkins, 2012, ISBN: 1451118945
4. Herzer KR, Mirrer M, Xie Y, **Steppan J**, Li M, Jung C, Cover R, Doyle PA, Mark LJ.: Patient Safety Reporting Systems: Sustained Quality Improvement Using a Multidisciplinary Team and “Good Catch” Awards. Sustaining, and Improving a Culture of Safety in Health Care, by The Joint Commission, Joint Commission Resources, 2nd edition, 2017, ISBN: 9781599409467
5. **Steppan J**, Maxwell B: Congenital Heart Disease. Stoelting’s Anesthesia and Co-Existing Disease, by Roberta L Hines and Katherine Marschall; Elsevier, 7th edition, ISBN-13: 978-0323401371
6. **Steppan J**, Nyhan D, Berkowitz DE. Development of Novel Arginase Inhibitors for Therapy of Endothelial Dysfunction. The role of arginase in endothelial dysfunction, by Rudolf Lucas, 1st edition, 2018, ISBN: 978-2-88919-440-7
7. **Steppan J**, Hensley N, Nyhan D: Cardiac Anesthesia. In Press for Current Therapy in Thoracic and Cardiovascular Surgery, by Stephen C Yang and Duke E Cameron; Mosby, 2nd edition, *in Press*
8. Wadia R, **Steppan J**: Congenital Heart Disease. Stoelting’s Anesthesia and Co-Existing Disease, by Roberta L Hines and Katherine Marschall; Elsevier, 8th edition, 2021, ISBN: 978-0323718608
9. Schwerzmann M, Heggie J, **Steppan J**, Colman JM: Noncardiac Surgery in Adult Congenital Heart Disease. Diagnosis and Management of Adult Congenital Heart Disease, by Michael A Gatzoulis, Piers EF Daubeney, Gary D Webb, 4<sup>th</sup> edition, 2023, *in Press*

#### Books, Textbooks [BK]

1. Santhanam, L., **Steppan, J.**, Nyhan, D., eds. (2022). Cardiovascular Remodeling in Aging and Disease. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88974-785-6

## Editorials [ED]

1. **Steppan J**, Dan Berkowitz DE, Nyhan D. Ischemic Post-Conditioning and Milrinone. *J Cardiothorac Vasc Anesth*. 2018 Feb 2. pii: S1053-0770(18)30089-2.
2. Goeddel LA, Frank SM, **Steppan J**. Blood transfusion in cardiac surgery: Balancing science and art. *J Cardiothorac Vasc Anesth*. 2018 Jan 31. pii: S1053-0770(18)30022-3
3. Jung Y, **Steppan J**, Goeddel LA. Continuous versus bolus furosemide in the critically ill: More Questions than Answers. *J Cardiothorac Vasc Anesth*. 2018 Feb 22. pii: S1053-0770(18)30133-2.
4. Steppan D, **DiGiusto M**, **Steppan J**. Beyond the vasculature and parenchyma – Perioperative Lung Ultrasound in the PICU. *J Cardiothorac Vasc Anesth*. 2020 Jan 20. pii: S1053-0770(20)30092-6
5. **Steppan J**, Nyhan D, Santhanam L. Editorial: Cardiovascular Remodeling in Aging and Disease. *Front Physiol*, 07 March 2022
6. **Nyhan SM**, **Steppan J**. Con: It is not necessary to use a pulmonary artery catheter in cardiac surgery. *J Cardiothorac Vasc Anesth*. 2023 Apr;37(4):663-665

## Original Research, other [RO]

1. **Steppan J**, Streitberger K, Maier C, Hill H, Backs J, Plaschke K. Placebokontrollierte Untersuchung zerebraler und vegetativer Effekte von Akupunktur an Di4. *Deutsche Zeitschrift für Akupunktur*. 2008; 4(51)12-18 [peer reviewed but not Pubmed indexed]
2. **Steppan J**, Hofer S, Lang S, Martin E, Brückmann M, Weigand MA. Nicotine and Acetylcholine lead to distinct modulation of gene regulation. *Applied Cardiopulmonary Pathophysiology*. 2010;14(2):124-130 [peer reviewed but not Pubmed indexed]

## Media Releases or Interviews [MR]

1. Questions and answers cardiac anesthesia section of the anesthesia written board prep site “GasQuestions” GasQuestions, 2013, www.gasquestions.com, Editor David E Bravos
2. Lecture 31, Heart Diseases and Anesthesia 1 (audio recording)  
Audio-Digest Anesthesiology, 2nd edition, 2015, www.audio-digest.org, Project Manager Francesca Wright
3. Lecture 32, Heart Diseases and Anesthesia 2, (audio recording)  
Audio-Digest Anesthesiology, 2nd edition, 2015, www.audio-digest.org, Project Manager Francesca Wright
4. Episode 59: Pulmonary Hypertension (audio recording, podcast, accrac.com)  
AACRaC: Anesthesia and Critical Care Reviews and Commentary, by Jed Wolpaw
5. Society of Cardiovascular Anesthesiologists published 38th Annual Meeting and Workshops syllabus, “The Patient with Pulmonary Hypertension for Non-Cardiac Surgery”, 2016
6. American Society of Anesthesiology Review Course Lecture Syllabus, “Perioperative Management Strategies for Adults with Congenital Heart Disease Presenting for Non-cardiac Surgery”, 2016
7. Heart Diseases and Anesthesia Part 1 (audio recording)  
Audio-Digest Anesthesiology, 3rd edition, 2018, www.audio-digest.org, Project Manager Francesca Wright
8. Heart Diseases and Anesthesia Part 2, (audio recording)  
Audio-Digest Anesthesiology, 3rd edition, 2018, www.audio-digest.org, Project Manager Francesca Wright
9. Society of Cardiovascular Anesthesiologists published 40th Annual Meeting and Workshops syllabus, “Severe Pulmonary Hypertension and Non-Cardiac Surgery”, 2018
10. Episode 130: Anesthesia for Adults with Congenital Heart Disease (audio recording, podcast, accrac.com)  
AACRaC: Anesthesia and Critical Care Reviews and Commentary, by Jed Wolpaw
11. Society of Cardiovascular Anesthesiologists published 41st Annual Meeting and Workshops syllabus, “Severe Pulmonary Hypertension and Non-Cardiac Surgery”, 2019
12. CV Podcast 19: Adult Congenital Heart Disease (ACHD), Anesthesia Education Toolbox,  
<https://www.anesthesiatoolbox.com/videos/1648>, published 4/21/2020
13. Society of Cardiovascular Anesthesiologists published 42nd Annual Meeting and Workshops syllabus, “Severe Pulmonary Hypertension and Non-Cardiac Surgery”, 2020
14. Steppan, J.: Heart Diseases and Anesthesia Part 1. AudioDigest Anesthesiology 62:30 (August 14) 2020
15. Steppan, J.: Heart Diseases and Anesthesia Part 2. AudioDigest Anesthesiology 62:30 (August 14) 2020
16. Steppan, J.: Congenital Heart Disease. AudioDigest Anesthesiology 62:30 (August 14) 2020
17. Steppan, J.: Pulmonary Hypertension. AudioDigest Anesthesiology 62:30 (August 14) 2020
18. Editor, Frontiers Research Topic, “Cardiovascular Remodeling in Aging and Disease”, 2021

19. Stepan, J et al, Youtube video. CVSA Council 2020-2021: Membership Testimonials, <https://www.youtube.com/watch?v=XIYUBWvpLBs&t=450s>
20. Society of Cardiovascular Anesthesiologists published 43rd Annual Meeting and Workshops syllabus, “Severe Pulmonary Hypertension and Non-Cardiac Surgery”, 2021
21. Stepan J, Bulletin for the Chinese American Society of Anesthesiology, “A Perioperative Management Pathway for Patients with Pulmonary Hypertension”, August 2021 (<https://online.flipbuilder.com/ufec/ujmy/#.YR7sA7Pztig.wechat>)
22. Stepan, J.: Pulmonary Hypertension. AudioDigest Anesthesiology 63:31 (August 21) 2021
23. Society of Cardiovascular Anesthesiologists published 44th Annual Meeting and Workshops syllabus, “Severe Pulmonary Hypertension and Non-Cardiac Surgery”, 2022
24. Society of Cardiovascular Anesthesiologists published 45th Annual Meeting and Workshops syllabus, “Severe Pulmonary Hypertension and Non-Cardiac Surgery”, 2023
25. American Society of Anesthesiology online article: “Getting to the heart of the matter – expanding the point of care” published Oct 15<sup>th</sup> 2023, (<https://www.asameetingnewscentral.com/cardiac-anesthesia/article/22876110/getting-to-the-heart-of-the-matter>)
26. Society of Cardiovascular Anesthesiologists published 46th Annual Meeting and Workshops syllabus, “Severe Pulmonary Hypertension and Non-Cardiac Surgery”, 2024

## FUNDING

### EXTRAMURAL Funding

Research Extramural Funding – current

- |                     |  |
|---------------------|--|
| 01/04/20 – 03/31/25 | Lysyl oxidase like 2: A novel target in aging associated vascular stiffening.<br>R01HL148112<br>NIH – R01 Award<br>\$ 2,215,020<br>PI: Lakshmi Santhanam, PhD<br>Role: CO-I, 0% effort (salary support)                                      |
| 04/01/24 – 03/31/27 | The Role of the Unfolded Protein Response and LOXL2 in Heart Failure with Preserved Ejection Fraction.<br>24CDA1267633<br>AHA – Career Development Award<br>\$ 231,001<br>PI: Maria Bauer, MD<br>Role: Mentor, 5% effort (0% salary support) |
| 09/13/24 – 08/31/25 | Thrombospondin-1’s role in heart failure with preserved ejection fraction (HFpEF)<br>NIH – R56 Award<br>\$ 399,516<br>PI: Jochen Stepan, MD, DESA, FAHA, FASA<br>Role: PI, 25% effort (salary support)                                       |

Research Extramural Funding – Pending

- |                     |   |
|---------------------|---|
| 04/01/23 – 02/31/28 | Mechanisms of vascular smooth muscle cell stiffening in aging.<br>NIH – R01 Award<br>\$ 3,946,065<br>PI: Lakshmi Santhanam, PhD<br>Role: CO-I, 5% effort (salary support)<br>UNDER REVIEW (revision #1) |
|---------------------|---|



- 07/01/24 – 06/30/29 Defining the role of LOXL2 in treating pulmonary hypertension.  
NIH – R01 Award  
\$ 3,181,491  
PI: Jochen Steppan, MD, DESA, FAHA, FASA  
Role: PI, 25% effort (salary support)  
UNVER REVIEW (revision #2)
- 07/01/24 – 06/30/29 Thrombospondin-1's role in heart failure with preserved ejection fraction (HFpEF)  
NIH – R01 Award  
\$ 3,108,155  
PI: Jochen Steppan, MD, DESA, FAHA, FASA  
Role: PI, 25% effort (salary support)  
TO BE RESUBMITTED 9/30/24 (revision #3)

[\*If neither of the R01s are getting funded this cycle, I will apply for an R35, MERA award next]

Research Extramural Funding – Previous

- 07/1/14 – 06/30/16 The Role of LOXL2 in Vascular Stiffness  
MRTG-BS IS117853  
Foundation for Anesthesia Education and Research (FAER)  
\$175,000  
PI: Jochen Steppan, MD, DESA  
Role: PI, 12% year one, 37% year two (salary support)
- 06/16 – 5/17 Arginase in the Treatment of Sickle Cell Vasculopathy  
Calithera  
\$92,502  
PI: Dan E Berkowitz, MD  
Role: CO-I, 5% effort (salary support)
- 08/16 – 08/17 The Contribution of lysyl oxidase-like 2 to systemic vascular stiffening  
Boehringer Ingelheim Fonds  
€19,200  
PI: Jochen Steppan, MD, DESA  
Role: PI, 0% effort (salary support)
- 07/01/18 – 06/30/20 The role of LOXL2 in Pulmonary hypertension  
ID# 129361  
SCA/IARS Mid-Career Grant  
\$ 100,000  
PI: Jochen Steppan, MD, DESA  
Role: PI, 1% effort (salary support)
- 01/01/19 – 12/31/23 The therapeutic role of LOXL2 in pulmonary hypertension.  
K08HL145132  
NIH – K08 Award  
\$ 858,600  
PI: Jochen Steppan, MD, DESA  
Role: PI, 75% effort (salary support)
- 11/23/21 – 10/31/22 Cardiovascular Outcomes Research in Perioperative Medicine - COR-PM  
R13HL162411  
NIH – R13 Award

\$ 10,000  
PI: Karsten Bartels, MD  
Role: Co-I, 0% effort (salary support)

System Innovation or Quality Improvement Extramural Funding - Previous  
07/01/20 – 06/30/21 Adverse Events and Intraoperative Management of Pulmonary Hypertensive Crisis in Patients with Vein of Galen Malformation: A Quality Improvement Project  
Quality Research Core (QRC) Micro Grant  
\$2,000  
PI: Jochen Steppan, MD, DESA, FAHA  
Role: PI, 0% (salary support)

### **INTRAMURAL Funding**

#### Research Intramural Funding – current

01/01/24 – 12/31/24 HFpEF prevention in vivo  
80064536  
ACCM Bridge Funding - Department of Anesthesiology and Critical Care Medicine  
\$150,000  
PI: Jochen Steppan, MD, DESA, FAHA, FASA, D.ABA  
Role: PI, 25% (salary support)

#### Research Intramural Funding – Previous

03/1/16 – 02/28/17 Investigating the use of upconverting nanocrystals for the wavelength specific light treatment of pulmonary hypertension  
StAAR Transformative Award  
Department of Anesthesiology and Critical Care Medicine  
\$25,000  
PI: Lakshmi Santhanam, PhD  
Role: Co-I, 0% (salary support)

03/1/16 – 02/28/17 Dual role of tissue transglutaminase in vascular stiffening  
StAAR Investigator Award  
Department of Anesthesiology and Critical Care Medicine  
\$60,000  
PI: Lakshmi Santhanam, PhD  
Role: Co-I, 0% (salary support)

03/1/16 – 02/28/17 The contribution of lysyl oxidase-like 2 to systemic vascular stiffening  
StAAR Investigator Award  
Department of Anesthesiology and Critical Care Medicine  
\$60,000  
PI: Jochen Steppan, MD, DESA  
Role: PI, 0% (salary support)

02/01/17 – 04/31/18 Predictors of Development of New Atrial Fibrillation in Patients with Mitral Regurgitation  
StAAR Mentored Award  
Department of Anesthesiology and Critical Care Medicine  
\$30,000  
PI: Megan Kostibas  
Role: Co-I, 0% (salary support)

07/01/17 – 06/30/18 The contribution of lysyl oxidase-like 2 to pulmonary vascular stiffening  
StAAR Investigator Award  
Department of Anesthesiology and Critical Care Medicine

- \$60,000  
 PI: Jochen Steppan, MD, DESA  
 Role: PI, 0% (salary support)  
 01/01/21 – 12/31/21 The contribution of vascular stiffening to neurological outcomes after cerebral aneurysm surgery StAARter Clinical Research Core Award  
 Department of Anesthesiology and Critical Care Medicine  
 \$3,900  
 PI: Jochen Steppan, MD, DESA  
 Role: PI, 0% (salary support)  
 07/01/22 – 06/30/23 The role of lysyl oxidase like 2 in dysregulated unfold protein response in HFpEF  
 StAAR Mentored Training Award Grant  
 Department of Anesthesiology and Critical Care Medicine  
 \$30,000  
 PI: Maria Bauer, MD  
 Role: Mentor, 0% (salary support)
- 07/01/22 – 06/30/23 Pulmonary artery remodeling in patients with pulmonary hypertension  
 StAAR Mentored Training Award Grant  
 Department of Anesthesiology and Critical Care Medicine  
 \$30,000  
 PI: Sinead M Nyhan, MD  
 Role: Mentor, 0% (salary support)

## CLINICAL ACTIVITIES

### Clinical Focus

I am focused on providing anesthesia for adults and children with congenital and / or acquired heart disease undergoing either cardiac or non-cardiac surgery. Moreover, I lead the effort to coordinate the perioperative care for adults with high risk cardiac and vascular disease, such congenital heart disease, severe pulmonary hypertension, mechanical assist devices, or end stage heart failure, who are undergoing non-cardiac surgery. In a collaborative effort with our pediatric cardiac surgeons and perfusionists, I spearheaded the development of new evidence-based perfusion guidelines for pediatric cardiopulmonary bypass.

### Certification

#### Medical, other state/government licensure

4/12 – present Maryland Medical License (#D0073948), renewed 2013, 2015, 2017, 2019, 2021, 2023

#### Boards, other specialty certification

2013 – Present Board Certified, American Board of Anesthesiology (#51386, recertified 2023)

2013 – Present Examination of Special Competence in Advanced Perioperative Transesophageal Echocardiography (#2013-00025499, re-certified 2023: #2022-00025499)

2014 – Present European Diploma in Anaesthesiology (#N/A)

2023 – Present Board Certified, Adult Cardiac Anesthesiology [first cohort of providers who took this new exam]

#### Clinical (Service) Responsibilities

2013 – 2017 Director Cardiac Anesthesia Morning Conference Series

2015 – Present Director of Perioperative Medicine, High Risk Cardiovascular Disease, 10%

#### Clinical Productivity (such as the annual number of patients evaluated or treated, procedures performed, tertiary referrals, wRVUs, etc.)

2013 – 2014 Targeted clinical effort assignment of 50 % (50% adult cardiac, 50% pediatric cardiac)

2014 – 2016 Targeted clinical effort assignment of 20 % (100% pediatric cardiac)

2016 – 2018 Targeted clinical effort assignment of 40 % (50% adult cardiac, 50% pediatric cardiac)

2018 – 2023	Targeted clinical effort assignment of 20 % (100% pediatric cardiac)
2023 – 2024	Targeted clinical effort assignment of 30 % (100% pediatric cardiac)
2024 – present	Targeted clinical effort assignment of 40 % (100% pediatric cardiac)

### Clinical Program Building / Leadership

2015 – Present	Lead coordinator of the perioperative care for high-risk cardiovascular patients
2016 – 2020	Development of a new perfusion protocol for pediatric cardiopulmonary bypass

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

### Educational Focus

My educational focus is on congenital heart disease and how to optimally manage adults and children with significant disease presenting for surgery. I furthermore specialize in education about severe cardiovascular diseases, such as pulmonary hypertension.

### Teaching and Facilitating Learning

#### Classroom instruction

##### *JHMI/Regional*

04/12	Lecturer, Anesthesiology residents, “ACCM Resident Research Opportunities – Finding and Engaging JHM Research Faculty using the ACCM Learning Lab”, System’s Based Practice Course, Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University School of Medicine, Baltimore MD
05/12	Lecturer, faculty and staff of the Department for Anesthesiology and Critical Care Medicine, “Aging and Vascular Stiffness”, Department of Anesthesiology and Critical Care Medicine Mini Grand Rounds, Johns Hopkins University School of Medicine, Baltimore MD
09/12	Lecturer, Cardiothoracic Anesthesia Division, “Vasopressin – Its Role in Cardiac Surgery”, Division of Cardiac Anesthesia Morning Conference, Johns Hopkins University School of Medicine, Baltimore MD
03/13	Lecturer, Cardiothoracic Anesthesia Division, “Vascular Stiffness – The role of tissue transglutaminase in aging associated vascular stiffness”, Division of Cardiac Anesthesia Morning Conference, Johns Hopkins University School of Medicine, Baltimore MD
04/13	Lecturer, Cardiac Surgical Intensive Care Unit Staff and Faculty, “Coagulation – A Brief Refresher”, Cardiac Surgical Intensive Care Unit QI meeting, Johns Hopkins University School of Medicine, Baltimore MD
2013 – Present	Lecturer, Clinical Pearls Lecture Series given annually to incoming cardiac anesthesia fellows, “Congenital Heart Disease” and “Pulmonary Hypertension”, Johns Hopkins University School of Medicine, Baltimore MD
2013 – Present	Lecturer, Cardiac Anesthesia Echocardiography lecture series given annually to the cardiac anesthesia fellows, “Echocardiographic Evaluation of the Right Ventricle”, Johns Hopkins University School of Medicine, Baltimore MD
2013 – 2017	Lecturer, “Echocardiographic Evaluation of Ventricular Assist Devices”, Cardiac Anesthesia Echocardiography lecture series given annually to the cardiac anesthesia fellows, Johns Hopkins University School of Medicine, Baltimore MD
12/13	Lecturer, Anesthesia residents (CA2&3), “Perioperative Cardiopulmonary Risk”, College Day Lecture Series, Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University School of Medicine, Baltimore MD
03/14	Lecturer, Anesthesia residents (CA2&3), “Cardiovascular Pharmacology Advanced”, College Day Lecture Series, Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University School of Medicine, Baltimore MD
05/14 – 05/15	Lecturer, Anesthesia residents (CA1), “Monitoring Methods”, Interactive Review Course, Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University School of Medicine, Baltimore MD

- 12/14 Lecturer, Cardiothoracic Anesthesia Division, “Anesthetic Management and Considerations for Adult Congenital Heart Disease”, Division of Cardiac Anesthesia Morning Conference, Johns Hopkins University School of Medicine, Baltimore MD
- 04/15 Lecturer, Anesthesia residents (CA1), “Cardiovascular Pharmacology”, College Day Lecture Series, Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University School of Medicine, Baltimore MD
- 04/15 Lecturer, Midlevel providers in the preoperative evaluation clinic, “Update on Pulmonary Hypertension”, Johns Hopkins University School of Medicine, Baltimore MD
- 2015 – Present Instructor, incoming Pediatric Anesthesia fellows, “Introduction to, and Anesthetic Management of Congenital Heart Disease”, Pediatric Anesthesiology Fellowship Orientation Lecture Series given annually, Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University School of Medicine, Baltimore MD
- 2015 – 2016 Lecturer, incoming Pediatric Anesthesia fellows, “Introduction to cardiopulmonary bypass”, Pediatric Anesthesiology Fellowship Orientation Lecture Series, Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University School of Medicine, Baltimore MD
- 09/15 Lecturer, Pediatric Anesthesia fellows, “Pulmonary Hypertension”, Pediatric Anesthesiology Fellow Lecture Series, Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University School of Medicine, Baltimore MD
- 2016– Present Lecturer, Cardiac Anesthesia Echocardiography lecture series given annually to the cardiac anesthesia fellows, “Echocardiographic Evaluation of Adult Congenital Heart Disease”, Johns Hopkins University School of Medicine, Baltimore MD
- 04/17 Lecturer, Anesthesiology residents, “POCUS lecture: Congenital Heart Disease”, Johns Hopkins University School of Medicine, Baltimore MD
- 04/17 Lecturer, Anesthesiology residents, “Perioperative Management Strategies for Adults with Complex Congenital Heart Disease Presenting for Non-Cardiac Surgery”, Johns Hopkins University School of Medicine, Baltimore MD
- 04/18 Lecturer, Anesthesiology residents, “Pulmonary Hypertension: A Case Discussion”, Johns Hopkins University School of Medicine, Baltimore MD
- 05/20 Lecturer, Cardiothoracic Anesthesia Division, “Vascular remodeling in pulmonary hypertension”, Division of Cardiac Anesthesia Morning Conference, Johns Hopkins University School of Medicine, Baltimore MD

*National*

- 07/06/23 Lecturer, Anesthesia Resident Seminar, Vanderbilt University “How to approach Adults with Congenital Heart Disease Presenting for non-cardiac Surgery”, Nashville, TN

**Clinical instruction**

*JHMI/Regional*

- 05/14 Instructor, Anesthesia Residents, “One Lunge Ventilation”, Simulation Exercises and Workshop for Residents, Johns Hopkins University, Baltimore, MD
- 2015 – Present Attending, Pediatric Anesthesia Fellows, “Pediatric Cardiac Anesthesia Orientation”, Annual Internal Publication for incoming Pediatric Anesthesia Fellows, Johns Hopkins University, Baltimore, MD
- 08/15 Instructor, Anesthesia Residents, “Drug Errors”, Simulation Exercises and Workshop for Residents, Johns Hopkins University, Baltimore, MD
- 08/16 Attending, CVDL Anesthesia Providers, “Percutaneous Pulmonic Valve Implantation: Medtronic Melody Valve”, Practice Guideline, Johns Hopkins University, Baltimore, MD
- 10/16 Attending, Providers taking care of pediatric cardiac patients (anesthesiologists, cardiologists, surgeons, intensivists; attendings, nurses, nurse practitioners, fellows), “Anesthetic considerations pre-bypass for children with transposition of the great arteries”, Pediatric Cardiac Perioperative Multidisciplinary Conference, Johns Hopkins University, Baltimore, MD
- 11/16 Attending, Providers taking care of pediatric cardiac patients (anesthesiologists, cardiologists, surgeons, intensivists; attendings, nurses, nurse practitioners, fellows), “Anesthetic considerations for children with Truncus Arteriosus”, Pediatric Cardiac Perioperative Multidisciplinary Conference, Johns Hopkins University, Baltimore, MD

- 02/17 Attending, Providers taking care of pediatric cardiac patients (anesthesiologists, cardiologists, surgeons, intensivists; attendings, nurses, nurse practitioners, fellows), “Anesthetic considerations for children with Tetralogy of Fallot”, Pediatric Cardiac Perioperative Multidisciplinary Conference, Johns Hopkins University, Baltimore, MD
- 04/17 Attending, Providers taking care of pediatric cardiac patients (anesthesiologists, cardiologists, surgeons, intensivists; attendings, nurses, nurse practitioners, fellows), “Anesthetic considerations for children with Aortic Coarctation”, Pediatric Cardiac Perioperative Multidisciplinary Conference, Johns Hopkins University, Baltimore, MD
- 2017 – Present Instructor, Anesthesia Residents, “Simulation Boot Camp”, 1 Week of full day Simulation Exercises for Incoming Anesthesia Residents, Johns Hopkins University, Baltimore, MD
- 11/ 17 Instructor, Anesthesia Residents, “Drug Errors”, Simulation Exercises and Workshop for Residents, Johns Hopkins University, Baltimore, MD
- 04/18 Instructor, Anesthesia Residents, “One Lunge Ventilation”, Simulation Exercises and Workshop for Residents, Johns Hopkins University, Baltimore, MD
- 06/18 Instructor, Anesthesia Residents, “Perioperative Use of Ultrasound”, Simulation Exercises and Workshop for Residents, Johns Hopkins University, Baltimore, MD
- 06/18 Attending, Providers taking care of pediatric cardiac patients (anesthesiologists, cardiologists, surgeons, intensivists; attendings, nurses, nurse practitioners, fellows), “Anesthetic considerations for adults with congenital heart disease”, Pediatric Cardiac Perioperative Multidisciplinary Conference, Johns Hopkins University, Baltimore, MD
- 11/20 Lecturer, faculty and staff of the Department for Anesthesiology and Critical Care Medicine, “Consult service for patients with high-risk cardio-vascular disease presenting for non-cardiac surgery”, ACCM Grand Rounds, Johns Hopkins University, Baltimore, MD

#### CME instruction

##### *JHMI/Regional*

- 05/16 Instructor, Cardiac Anesthesia Faculty and Staff, “Epoprostenol Infusion Pumps”, PBLD, Johns Hopkins University, Baltimore, MD

##### *National*

- 04/16 Instructor, Cardiac Anesthesia Faculty and Staff, “The Patient with Pulmonary Hypertension for Non-Cardiac Surgery”, PBLD, Society of Cardiovascular Anesthesiologists, 38<sup>th</sup> Annual Meeting and Workshops, San Diego, CA
- 04/18 Instructor, Cardiac Anesthesia Faculty and Staff, “The Patient with Pulmonary Hypertension for Non-Cardiac Surgery”, PBLD, Society of Cardiovascular Anesthesiologists 40<sup>th</sup> Annual Meeting and Workshops, Phoenix, AZ
- 05/19 Instructor, Cardiac Anesthesia Faculty and Staff, “Severe Pulmonary Hypertension and Noncardiac Surgery - No Need to be Afraid”, PBLD, Society of Cardiovascular Anesthesiologists 41<sup>st</sup> Annual Meeting and Workshops, Chicago, IL
- 04/20 Instructor, Cardiac Anesthesia Faculty and Staff, “Severe Pulmonary Hypertension and Noncardiac Surgery - No Need to be Afraid”, PBLD, Society of Cardiovascular Anesthesiologists 42<sup>nd</sup> Annual Meeting and Workshops, Palm Beach, Fl (*cancelled due to COVID-19*)
- 05/22 Instructor, Cardiac Anesthesia Faculty and Staff, “Severe Pulmonary Hypertension and Noncardiac Surgery - No Need to be Afraid”, PBLD, Society of Cardiovascular Anesthesiologists 2022 Annual Meeting and Workshops, Palm Springs, CA
- 05/23 Instructor, Cardiac Anesthesia Faculty and Staff, “Severe Pulmonary Hypertension and Noncardiac Surgery - No Need to be Afraid”, PBLD, Society of Cardiovascular Anesthesiologists 2023 Annual Meeting and Workshops, Portland, OR
- 05/23 Instructor, Cardiac Anesthesia Faculty and Staff, “Adult Congenital Heart Disease – When your 30-Year-old Patient has a Sternotomy scar”, PBLD, Society of Cardiovascular Anesthesiologists 2023 Annual Meeting and Workshops, Portland, OR

### *International*

- 04/21 Instructor, Cardiac Anesthesia Faculty and Staff, “Severe Pulmonary Hypertension and Noncardiac Surgery - No Need to be Afraid”, PBLD, Society of Cardiovascular Anesthesiologists 2021 Annual Meeting & Workshops, Toronto, Canada (*virtual due to COVID-19*)
- 04/29/24 Instructor, Cardiac Anesthesia Faculty and Staff, “Severe Pulmonary Hypertension and Noncardiac Surgery - Handle It Like an Expert OR No Need to Be Afraid”, PBLD, Society of Cardiovascular Anesthesiologists 2024 Annual Meeting and Workshops, Toronto, Canada

### Workshops /seminars

#### *JHMI/Regional*

- 04/14 Instructor, Anesthesia Residents, “TEE Workshop”, Mid-Atlantic Anesthesia Research Conference, Baltimore, MD
- 09/19 Attending, Business leaders and graduate students, “Foundations of Leadership & Management”, Carey Business School, Executive Education Course, Baltimore, MD
- 10/20 Attending, Business leaders and graduate students, “Leading Inclusively”, Carey Business School, Executive Education Course, Baltimore, MD
- 12/20 Attending, Business leaders and graduate students, “Strategic Conflict Management”, Carey Business School, Executive Education Course, Baltimore, MD
- 01/21 Attending, Business leaders and graduate students, “Business Writing”, Carey Business School, Executive Education Course, Baltimore, MD

### *National*

- 04/16 Attending, Anesthesia faculty, “Three Dimensional TEE Workshop”, Beth Israel Deaconess Medical Center, Boston, MA
- 04/2020 Instructor, Cardiac Anesthesia Faculty and Staff, “Focused on POCUS: Learning & Refining This Very Important Craft!”, Society of Cardiovascular Anesthesiologists 42<sup>nd</sup> Annual Meeting and Workshops, Palm Beach, FL (*cancelled due to COVID-19*)
- 02/2022 Attending, Anesthesia faculty, “SCA 2022 Annual Echo Week”, Society of Cardiovascular Anesthesiologist, Atlanta, GA (*virtual due to COVID19*)

### *International*

- 06/11/22 Speaker, Cardiac Congenital Anesthesia Society (CCAS), “Anesthetic management of the child with pulmonary hypertension for diagnostic imaging and surgery”, Webinar
- 12/12/23 Speaker, International Anesthesia Research Society (IARS) 2023 Webinar Series, “Pulmonary Hypertension Update: Definition, Dangers and Disasters; Roadmap for Perioperative Management – Crystal Clear Advice”, Webinar [753 registered attendees \*highest attendance ever for an IARS webinar\*]
- 03/19/24 Speaker, North American Vascular Biology Organization (NAVBO) Symposium titled: ‘Aortic stiffness: Cause or consequence of cardiovascular disease’, “Extracellular matrix remodeling in aortic stiffening”, Online Symposium
- Scheduled
- 12/11/24 Speaker, Medtronic Webinar series, “Improved neurological outcome through targeting cerebral vascular autoregulation”, Online Symposium

### Mentoring, coaching, and advising

#### Pre-doctoral Advisees /Mentees

- 2016 – 2022 Marcel Rauer, medical thesis candidate, University of Muenster, Germany, mentor on his laboratory work for his medical thesis at Johns Hopkins. [OR44]
- 2016 – 2019 Ravi Medikonda, medical student, Johns Hopkins University, Baltimore, currently Neurosurgery Resident Stanford, CA, publication in review at World J Pediatr Congenit Heart Surg: “Best Practices in Pediatric Perfusion Strategies on Cardiopulmonary Bypass”. [RA5, RA7]

- 2020 – 2021 Brian Lo, medical student, Johns Hopkins University, Baltimore, currently in medical school, “Storage Duration of Transfused Red Blood Cells and Perioperative Outcomes Following Pediatric Cardiac Surgery”, second author on a publication at *Vox Sanguinis*. [OR48]
- 2020 – present Shu Zhang, M2 medical student, Johns Hopkins University, Baltimore, currently in medical school, project: “The contribution of vascular stiffening to neurological outcomes after cerebral aneurysm surgery”, Manuscript written, to be submitted to A&A

#### Post-doctoral Advisees /Mentees

- 2014 – 2015 Daijiro Hori, MD; currently instructor, Department of Cardiovascular Surgery, Saitama Medical Center, Japan; mentoring on cardiovascular physiology and experiments in rodent models; co-authored articles OR 25, 27
- 2015 – 2016 Krishnan Chakravarthy, MD, PhD; CA3 resident, Johns Hopkins Hospital. Currently assistant professor in the department of anesthesiology and pain medicine at UCSD Health Sciences. He also serves as Chairman and CEO of NanoAxis; co-authored article CR 2
- 2015 – 2017 Yohei Nomura, MD; Post Doctoral Research Fellow, Johns Hopkins University, Baltimore, MD; mentoring on cardiovascular physiology and experiments in rodent models; manuscript in Preparation for JAHA: “The Role of LOXL2 in Vascular Stiffening”
- 2015 – present Natalia Diaz-Rodriguez, MD; CA2 resident, Johns Hopkins Hospital. Currently pediatric anesthesia faculty at Johns Hopkins supported by a T32 grant; Poster at the 5th Annual Thoracic Anesthesia Symposium (2016): “Perioperative Management of a Jehovah’s Witness status post Fontan Palliation, presenting with Pheochromocytoma and a Liver Mass”. Poster at Anesthesiology 2016: “Programmatic Approach to Patients at High Cardiovascular Risk”. Co-authored article CR 2 and OR 43
- 2015 – 2016 Amrita Cheema, MD; cardiac anesthesia fellow, Johns Hopkins Hospital. Currently Assistant Clinical Professor, Pro Medica Physicians Group, University Toledo College of Medicine; first author RA 5
- 2015 – 2017 Susan Sankova, MD; CA3 resident, Johns Hopkins Hospital. Currently Assistant Professor University of Maryland; manuscript prepared for Anesthesiology: “Transfusion thresholds in pediatric cardiac surgery”
- 2016 – 2017 Shahab Khademi, DO, cardiac anesthesia fellow, Johns Hopkins University, currently a Cardiac Anesthesiologist, Geisinger-Community Medical Center, Scranton, PA; poster at the Society for Cardiovascular Anesthesiology Meeting 2017: “Anesthetic management of an adult with Ebstein’s anomaly status post fenestrated lateral tunnel Fontan undergoing posterior spinal fusion for scoliosis”
- 2016 – 2019 Chin Siang Ong, MBBS; PhD student, Johns Hopkins University. Currently Assistant Professor of Surgery, Yale University, New Haven, CT. Publication under review for World J Pediatr Congenit Heart Surg: “Best Practices in Pediatric Perfusion Strategies on Cardiopulmonary Bypass”
- 2016 – 2019 Giancarlo Suffredini, MD; anesthesia resident, Johns Hopkins University. Currently cardiac anesthesia faculty at Johns Hopkins, first author article CR 2
- 2017 – 2018 Stephanie Ibekwe, MD; cardiac anesthesia fellow, Johns Hopkins University; Currently Adult Cardiothoracic Anesthesiology Assistant Professor at Baylor College of Medicine- Ben Taub, Houston, TX; co-author RA 5
- 2017 – 2018 Nicolas Mottard, MD; Research Fellow, Johns Hopkins University; Currently Anesthesia Consultant, Clinique de la Sauvegarde, Lyon, France; mentoring on cardiovascular physiology and experiments in rodent models
- 2018 – 2020 Youn-Hoa Jung, MD; obstetric anesthesia fellow. Currently Assistant Professor of Anesthesiology and Critical Care Medicine, Johns Hopkins University, Baltimore, MD, poster at the SCA 41<sup>st</sup> Annual Meeting & Workshops (2019): “Cesarean Delivery in a Patient status post Fontan Procedure for Double Inlet Double Outlet Right Ventricle”.
- 2018 – 2020 Asif Padiyath, MD, anesthesia resident, Johns Hopkins University, Currently attending anesthesiologist Division of Cardiothoracic Anesthesiology at Children's Hospital of Philadelphia, PA. “Storage Duration of Transfused Red Blood Cells and Perioperative Outcomes Following Pediatric Cardiac Surgery”, first author on a poster at ACCM 2019 Research Day, first author of poster and an oral presentation at SPA-AAP Pediatric Anesthesiology 2020, Atlantis Paradise Island, Bahamas – where it won the second price for the AAP John J. Downes Resident Research Award.
- 2019 – 2021 Matthew DiGiusto, MD, anesthesia resident, Johns Hopkins University, second author RA 8 and ED4



- 2020 – present Maria Bauer, MD, anesthesia faculty, Johns Hopkins University, first author JHU research day poster (2020, 2021, and 2022). Mentor on her StAAR mentored training grant to study the role of LOXL2 in the unfold protein response and submission of an AHA CDA.
- 2020 – present Eric Etchill, MD, Surgery Research Fellow, Johns Hopkins University, “The role of lactate in pediatric cardiopulmonary bypass”
- 2021 – present Julia Barbur, Medical Student, Johns Hopkins University, “The role of lactate in pediatric cardiopulmonary bypass”
- 2020 – present Sinead M. Nyhan, anesthesia faculty, Johns Hopkins University, author on OR16, OR17, RA10, RA11, CR3, Primary Mentor on her StAAR mentored training grant to study pulmonary hypertension in cardiac surgical patients

#### Thesis committees

- 2016 – 2022 Marcel Rauer, University of Muenster, Germany, “LOXL2 and vascular stiffening”, mentor, laboratory work medical thesis is done at Johns Hopkins.
- 2023 – present Luying Yan, Yale University, New Haven, CT, “Perioperative Outcomes in Patients with Systemic Sclerosis: An Analysis of a Large Case Series”, medical thesis done at Yale University

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

#### Research Focus

I started out researching endothelial dysfunction (nitric oxide signaling and arginase), vascular changes in sepsis (central sympatholytics), and basic pharmacology (signaling mechanisms and second messengers). My primary focus and long-term goal is to identify, characterize, and develop potential targets to treat or even reverse vascular stiffening. Specifically, I am interested to determine how the crosslinking enzymes tissue transglutaminase and lysyl oxidase like-2 influence cellular and tissue mechanics in models of pulmonary or systemic hypertension, as well as in aging and most recently heart failure. This will potentially lead to the discovery and characterization of a novel therapeutic target to treat vascular stiffness.

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

- 07/13 – present Basic rodent surgery and tissue harvest; undergrad students and technicians; Laboratory Orientation Course; Johns Hopkins University, Baltimore, MD
- 07/14 – present Advanced rodent surgery and interventions; PhD students and post-doctoral fellows; Longitudinal Laboratory Teaching, Johns Hopkins University, Baltimore, MD
- 01/22 – present Laboratory techniques and scientific methods; undergrad students from underrepresented and disadvantaged backgrounds; Program Faculty R25 program; Johns Hopkins University, Baltimore, MD

#### Inventions, Patents, Copyrights

- 06/06 Co-Author [Berkowitz DE, Hare JM, Shoukas AA, Champion H, **Steppan J**]. Arginase II: A Target Treatment of Aging Heart and Heart Failure. US 2009/0298912 A1, awarded 12/2009
- 08/2012 Co-Author [Barodka VM, Berkowitz DE, **Steppan J**, Nyhan D]. Method and Device for Continuous Non-invasive Real Time Cardiac Output Monitor, patent pending

### SYSTEM INNOVATION AND QUALITY IMPROVEMENT ACTIVITIES

#### System Innovation Focus

I focus on improving perioperative care for patients with high-risk cardiovascular disease presenting for cardiac and non-cardiac surgery. I was intimately involved in generating a collaborative program to structure and improve the care of those patients. This program includes preoperative optimization, resource allocation, staffing, and transition to postoperative care. Currently I am evaluating and refining this program to extend the care from mainly patients with pulmonary hypertension to patients with other forms of severe cardiovascular compromise, such as adult congenital heart disease. Furthermore, I am interested in improving both our transfusion and perfusion strategies for pediatric patients undergoing cardiac surgery.

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

- 07/09 – 06/12 Longitudinal residency QI – project, Weinberg Operating Rooms, Johns Hopkins Hospital, Baltimore, MD; mitigation of hazards by creating an award-based program, that lead to sustained quality improvement initiatives
- 07/09 – 03/14 Core Anesthesia Liaison, CVSICU QI project, Johns Hopkins Hospital, Baltimore, MD; the creation of a protocol driven approach to extubation lead to an increased rate of fast track extubation of cardiac surgical patients that resulted in a significant decrease in extubation times
- 07/14 – present Core Faculty, Pulmonary Hypertension QI Project, Johns Hopkins Hospital, Baltimore, MD; the creation of a collaborative program led to the increased availability of cardiac anesthesia providers for those patients and a significantly lower rate of early readmissions.

### System Innovation and Quality Improvement Program Building/Leadership:

- 07/15 – present Director Perioperative Medicine High Risk Cardiovascular Disease (20%), I am leading the effort to extend the QI project for patients with pulmonary hypertension, to all patients with severe cardiovascular disease

## ORGANIZATIONAL ACTIVITIES

### Institutional Administrative Appointments

- 2013 – 2017 Chair Cardiac Anesthesia Morning Conference Series
- 2015 – present Director of Perioperative Medicine, High Risk Cardiovascular Disease; Perioperative evaluation of all patients with severe cardiac and vascular disease prior to undergoing surgery and directing their care  
[This program has been nominated multiple times for the Clinical Collaboration and Teamwork Award, one of the seven honors bestowed annually by the Johns Hopkins Medicine Clinical Awards for Physicians and Care Teams]

### Editorial Activities

#### Editorial Board appointments

- 2017 – present Member, Journal of Cardiothoracic and Vascular Anesthesia Editorial Board
- 2021 – present Member Frontiers in Physiology | Vascular Physiology Editorial Board

#### Journal peer review activities

- 2012 – present *Swiss Medical Weekly*
- 2014 – present *PLOS ONE*
- 2014 – present *Anesthesiology*
- 2014 – present *Atherosclerosis*
- 2015 – present *Anesthesia and Analgesia*
- 2015 – present *Anesthesia and Analgesia: Case Reports*
- 2015 – present *European Journal of Medical Research*
- 2016 – present *Journal of Neurology & Neuroscience*
- 2016 – present *Journal of Applied Physiology*
- 2019 – present *European Society of Cardiology Heart Failure*
- 2019 – present *CHEST*
- 2019 – present *Frontiers in Physiology*
- 2020 – present *World Journal Pediatric Congenital Heart Surgery*
- 2020 – present *Congenital Heart Disease*
- 2020 – present *Current Hypertension Reviews*
- 2021 – present *Journal of Clinical Medicine*
- 2021 – present *British Medical Journal Open*
- 2021 – present *Scientific Reports*

2021 – present *Current Hypertension Reviews*  
2021 – present *International Journal of Surgery*  
2022 – present *Circulation*  
2022 – present *Cardiology in the Young*  
2023 – present *Reviews in Cardiovascular Medicine*  
2024 – present *Clinical and Translational Medicine*  
2024 – present *Frontiers in Pediatrics*

#### Other peer review activities

2016 – present Abstract reviewer for Scientific Sessions, American Heart Association  
2016 – present Abstract reviewer for ACCM StAAR grants, Johns Hopkins University  
2016 – 2020 Grant Reviewer for the Society of Cardiovascular Anesthesiologists (SCA/IARS Starter Grants and SCA/IARS Mid-Career Grants)  
2019 Grant Review for the University of Toledo, OH  
2019 – present Grant Reviewer for the European Research Council, Brussels, Belgium  
2020 Grant Reviewer, American Heart Association Career Development Award Vascular Basic Sciences 2, American Heart Association  
2020 – present Abstract reviewer for the International Anesthesia Research Society (IARS), the Association of University Anesthesiologists (AUA), and the Society of Critical Care Anesthesiologists (SOCCA).  
2021 Grant Review for the German Research Foundation (Deutsche Forschungsgemeinschaft), Bonn, Germany  
2021 – 2023 Session Proposal Review Panelist for the IARS Annual Meeting (2022 and 2023)  
2022 – 2025 Grant Reviewer, American Heart Association Postdoctoral Fellowship Award Vascular Endothelial Biology, American Heart Association  
2024 Grant Review for the Imperial College London, London, UK

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

2016 – 2020 Member, Society of Cardiovascular Anesthesiologists Research Committee  
2019 – present Member, ACCM Basic Science Core, Johns Hopkins University, Baltimore, MD  
2019 – 2023 Member at large, Cardiovascular Surgery and Anesthesia Leadership Committee, Council on Cardiovascular Surgery and Anesthesia, American Heart Association  
2020 – present Member, American Heart Association Career Development Award Committee, American Heart Association  
2021 – 2025 Member, International Committee, Society of Cardiovascular Anesthesiologists  
2021 – 2024 Member, ASA Educational Track Subcommittee on Cardiac Anesthesia, American Society of Anesthesiology  
2021 – 2022 Adjunct Member, ASA Committee on Research, American Society of Anesthesiology  
2021 – 2024 Member, COR-PM Program Planning Committee, Society of Cardiovascular Anesthesiologists (Cardiovascular Outcomes Research in Perioperative Medicine)  
2022 – 2024 Member, **ASA Committee on Research**, American Society of Anesthesiology  
2024 **Chair, COR-PM Committee**, Society of Cardiovascular Anesthesiologists (Cardiovascular Outcomes Research in Perioperative Medicine)  
2024 – 2026 Member, Cardiovascular Surgery and Anesthesia Membership Committee, Council on Cardiovascular Surgery and Anesthesia, American Heart Association  
2024 – 2026 Member, **Scientific Program Planning Committee**, Society of Cardiovascular Anesthesiologists

#### Professional Societies

2004 – present American Heart Association (AHA)  
2004 – present Member  
2019 – present Fellow (FAHA)  
2006 – 2012 Member, Deutsche Ärztegesellschaft für Akupunktur (DÄGfA; German Medical Society for Acupuncture)  
2009 – present Member, International Anesthesia Research Society (IARS)  
2009 – present Member, American Society of Anesthesiologists (ASA)

- 2021 – present Fellow (FASA)
- 2012 – present Member, Society for Cardiovascular Anesthesiologists (SCA)
- 2016 – present Member, Society for Pediatric Anesthesia (SPA)
- 2016 – present Member, Congenital Cardiac Anesthesia Society (CCAS)
- 2018 – present Member, Pulmonary Vascular Research Institute (PVRI)
- 2018 – present Member, Association of University Anesthesiologists (AUA) [membership by invitation only]
- 2020 – present Member, Sigma Xi, The Scientific Research Honor Society [membership by invitation only]
- 2021 – present Member, Association of Cardiac Anesthesiologists (ACA) [membership by invitation only, limited to 60 active members]

### Conference Organizer

#### *JHMI/Regional*

- 12/2017 Faculty Lead, Annual ACCM Research Day Lunch Symposium, 18th Annual ACCM Research Day, Johns Hopkins University, Baltimore, MD

#### *National*

- 05/2022 Program Committee and founding member, Cardiovascular Outcomes Research in Perioperative Medicine (COR-PM) Conference, Palm Springs, CA
- 05/2023 Program Committee and founding member, Cardiovascular Outcomes Research in Perioperative Medicine (COR-PM) Conference, Portland, OR

#### *International*

- 04/2024 Program Committee and founding member, Cardiovascular Outcomes Research in Perioperative Medicine (COR-PM) Conference, Toronto, Canada

### Session Chair

#### *JHMI/Regional*

- 12/2014 Moderator Poster Session, Perioperative Medicine: In Vitro Modeling, 16th Annual ACCM Research Day, Johns Hopkins University, Baltimore, MD
- 11/2015 Faculty leader Cardiothoracic Medicine sessions, 17th Annual ACCM Research Day, Johns Hopkins University, Baltimore, MD
- 12/2018 Moderator Poster Session, Basic & Translational Sciences: General, 20th Annual ACCM Research Day, Johns Hopkins University, Baltimore, MD
- 12/2022 Moderator Poster Session, 24th Annual ACCM Research Day, Johns Hopkins University, Baltimore, MD

#### *National*

- 04/2020 Moderator, “Approaching adult congenital heart disease – From uncertain to fearless!”, Society of Cardiovascular Anesthesiologists 42<sup>nd</sup> Annual Meeting and Workshops, Palm Beach, FL (*cancelled due to COVID-19*)
- 10/2021 Moderator, “Pulmonary Hypertension Master Class”, American Society of Anesthesiology Annual Meeting: Anesthesiology 2021, San Diego, CA
- 04/2022 Moderator Poster Session, “Undergraduate Poster Competition”, American Society for Biochemistry and Molecular Biology, Experimental Biology 2022, Philadelphia, PA
- 04/2022 Mentor, 2<sup>nd</sup> Annual MRTG Annual Meeting, Washington, DC
- 10/2022 Moderator, American Society of Anesthesiology Annual Meeting: Anesthesiology 2022, “Pulmonary Hypertension Master Class”, New Orleans, LA
- 10/2022 Moderator, American Society of Anesthesiology Annual Meeting: Anesthesiology 2022, “Approaching Adult Congenital Heart Disease – From Uncertain to Confident”, New Orleans, LA
- 10/2023 Moderator, American Society of Anesthesiology Annual Meeting: Anesthesiology 2023, “Pulmonary Hypertension Master Class”, San Francisco, CA

## Scheduled:

- 10/2024 Moderator, “Rapid fire cases of patients with high-risk cardiac disease presenting for non-cardiac surgery”, American Society of Anesthesiology Annual Meeting: Anesthesiology 2024, Philadelphia, PA
- 10/2024 Moderator, “A Case Based Discussion of Adult Congenital Heart Disease – Tips & Tricks from the Experts”, American Society of Anesthesiology Annual Meeting: Anesthesiology 2024, Philadelphia, PA
- 10/2024 Moderator, “Pulmonary Hypertension - Masterclass”, American Society of Anesthesiology Annual Meeting: Anesthesiology 2024, Philadelphia, PA
- 11/2024 Moderator, “William W.L. Glenn Lecture”, Scientific Sessions, American Heart Association, Chicago, IL

## International

- 05/2015 Chair abstract session, Regional Anesthesia: Case Reports, Euroanaesthesia 2015, European Society of Anaesthesiology (ESA), Berlin, Germany
- 11/2020 AHA Representative IASC/AHA Joint Session with the Interamerican Society of Cardiology (IASC) /Sociedad Interamericana de Cardiología - (SIAC), Cartagena, Columbia (*cancelled due to COVID-19*)
- 04/2024 Moderator, Society of Cardiovascular Anesthesiologists 2024 Annual Meeting & Workshops, “How to set-up a collaborative multi-disciplinary clinical trial”, Toronto, Canada
- 04/2024 Moderator, Society of Cardiovascular Anesthesiologists 2024 Annual Meeting & Workshops, “Late Breaking Research Presentation”, Toronto, Canada

## RECOGNITION

### Awards, Honors

- 2006 German Acupuncture Award 2006 for best research study, Deutsche Ärztgesellschaft für Akupunktur (DÄGfA; German Medical Society for Acupuncture)
- 2009 Kosaka Award 2009, International Anesthesia Research Society
- 2010 Best Scientific Abstract, Maryland Society of Anesthesiologists
- 2010 Best Abstracts of the Meeting: Anesthesiology Editor’s Picks, American Society of Anesthesiologists Annual Meeting
- 2011 Best Scientific Abstract, Maryland Society of Anesthesiologists
- 2011 ACCM 2011 Research Award, first place in the cardiac and vascular section, 13th Annual ACCM Research Day, Johns Hopkins University, Baltimore, MD
- 2014 ACCM 2014 Research Award, second place in the cardiovascular medicine section, 16th Annual ACCM Research Day, Johns Hopkins University, Baltimore, MD
- 2015 ACCM 2015 Research Award for Cardiothoracic Medicine, 17th Annual ACCM Research Day, Johns Hopkins University, Baltimore, MD
- 2016 ACCM 2016 Research Award for Cardiopulmonary Medicine-1, 18th Annual ACCM Research Day, Johns Hopkins University, Baltimore, MD
- 2019 PVRI Abstract Award, Pulmonary Vascular Research Institute, PVRI World Congress on PVD, Barcelona, Spain
- 2019 ACCM 2019 Research Day Poster Award for Basic Science-1, 21st Annual ACCM Research Day, Johns Hopkins University, Baltimore, MD
- 2020 PVRI Best Basic Rapid Fire Award 2020, Pulmonary Vascular Research Institute, PVRI World Congress on PVD, Lima, Peru
- 2020 Second place AAP John J. Downes Resident Research Award (Senior author for that abstract), SPA-AAP Pediatric Anesthesiology 2020, Atlantis Paradise Island, Bahamas
- 2020 Top Research Abstract SCA's 2020 Annual Thoracic Anesthesia Symposium, West Palm Beach, FL
- 2022 Health Equity Honors, 24th Annual ACCM Research Day, Johns Hopkins University, Baltimore, MD
- 2022 ACCM 2022 2nd place for Research Award in Basic Cardiovascular & Pulmonary Science 2, 24th Annual ACCM Research Day, Johns Hopkins University, Baltimore, MD
- 2023 1st place for Research Award in Clinical and Translational Science 2, 25th Annual ACCM Research Day, Johns Hopkins University, Baltimore, MD

## Invited Talks

### *JHMI/Regional*

- 09/16/14 Speaker, Symposium on Vascular Stiffness, “The emerging role of LOXL2 in vascular stiffness”, Johns Hopkins University, Baltimore, MD
- 09/14/16 Speaker, Symposium: Making Vascular Connections, “LOXL2 as an emerging target in vascular stiffness”, Johns Hopkins University, Baltimore, MD
- 09/26/17 Speaker, Johns Hopkins Hospital Management Exchange Program for Chinese Healthcare Professionals, “Blue Baby Heart Disease - Treatment and Management Experiences of “Blue Baby” heart disease, cardiomyopathy and cardiac failure”, Johns Hopkins University, Baltimore, MD
- 03/01/18 Speaker, Anesthesiology and Critical Care Medicine Discovery Rounds, “Targeting matrix remodeling in vascular stiffening”, Johns Hopkins University, Baltimore, MD
- 12/13/18 Speaker, Lung Research Conferences, “Targeting pulmonary vascular stiffness via LOXL2 inhibition in pulmonary hypertension”, Johns Hopkins University, Baltimore, MD
- 05/29/20 Speaker, Anesthesiology Annual Class Reunion, “Pulmonary hypertension as a model to create a pathway for patients with complex cardiovascular disease undergoing non-cardiac surgery”, Johns Hopkins University, Baltimore, MD (*cancelled due to COVID-19*)
- 06/22/23 Speaker, Problem Based Learning Discussion, “Right ventricular failure in Patients with Pulmonary Hypertension”, Johns Hopkins University, Baltimore, MD
- 02/21/24 Speaker, Hospitalist Faculty Meeting, “Consult service for patients with high-risk cardio-vascular disease presenting for non-cardiac surgery”, Johns Hopkins University, Baltimore, MD

### *National*

- 10/25/16 Speaker, Refresher Course Lecture, American Society of Anesthesiology Annual Meeting: Anesthesiology 2016, “Perioperative Management Strategies for Adults with Complex Congenital Heart Disease Presenting for Non-Cardiac Surgery”, Chicago, IL
- 09/23/17 Speaker, Ophthalmic Anesthesia Society 31<sup>st</sup> Annual Scientific Meeting, “Cardiac Disease and Implications of Ophthalmic Surgery”, Chicago, IL
- 10/21/17 Speaker, Point Counterpoint Lecture, American Society of Anesthesiology Annual Meeting: Anesthesiology 2017, “Let’s not reinvent the wheel everyday: A programmatic approach to the perioperative management of patients with high-risk cardiovascular disease presenting for non-cardiac surgery”, Boston, MA
- 04/29/18 Speaker, Pro/Con Discussion, Society of Cardiovascular Anesthesiologists 40<sup>th</sup> Annual Meeting, “EP Lab: Does a Cardiac Anesthesiologist Need to Be Here? - Con”, Phoenix, AZ
- 08/15/18 Speaker, Thomas Jefferson University Cardiac Surgery Service Line Meeting, “Creating a pathway for patients with complex cardiovascular disease undergoing non-cardiac surgery”, Philadelphia, PA
- 05/20/19 Speaker, Society of Cardiovascular Anesthesiologists 41<sup>st</sup> Annual Meeting, “Perioperative Management Concepts for Adults with Congenital Heart Disease – Keys to Success”, Chicago, IL
- 05/21/19 Speaker, Society of Cardiovascular Anesthesiologists 41<sup>st</sup> Annual Meeting, “Why is Pulmonary Hypertension Important in the Preoperative Period”, Chicago, IL
- 04/17/20 Speaker, Society of Cardiovascular Anesthesiologists 2020 Annual Thoracic Anesthesia Symposium, “Metabolomics in Ischemia Reperfusion Lung Injury”, West Palm Beach, FL (*cancelled due to COVID-19*)
- 08/06/20 Speaker, American Society of Anesthesiology Annual Meeting: Anesthesiology 2020, “Perioperative Management Strategies for outpatients with subcutaneous pacemakers”, Washington, DC (*virtual due to COVID-19*)
- 11/14/20 Speaker, American Heart Association Scientific Sessions 2020, “Fellow to Faculty Options for Funding”, Dallas, Tx (*virtual due to COVID-19*)
- 10/10/21 Speaker, American Society of Anesthesiology Annual Meeting: Anesthesiology 2021, “The latest insights into the perioperative management of patients with Pulmonary Hypertension”, San Diego, CA
- 10/12/21 Speaker, Refresher Course Lecture, American Society of Anesthesiology Annual Meeting: Anesthesiology 2021, “Adult Congenital Heart Disease – Perioperative Management Pearls”, San Diego, CA

- 10/12/21 Speaker, American Society of Anesthesiology Annual Meeting: Anesthesiology 2021, “Perioperative Management Strategies for outpatients with subcutaneous pacemakers”, San Diego, CA
- 05/14/22 Speaker, Society of Cardiovascular Anesthesiologists 2022 Annual Meeting & Workshops, “What Does the Adult Cardiothoracic Anesthesiologist Need to Know About Congenital Heart Disease?”, Palm Springs, CA
- 05/15/22 Speaker, Society of Cardiovascular Anesthesiologists 2022 Annual Meeting & Workshops, “LVAD updates for 2022”, Palm Springs, CA
- 10/23/22 Speaker, American Society of Anesthesiology Annual Meeting: Anesthesiology 2022, “The latest insights into the perioperative management for patients with Pulmonary Hypertension”, New Orleans, LA
- 10/24/22 Speaker, American Society of Anesthesiology Annual Meeting: Anesthesiology 2022, “Patient with Left Ventricular Assist Device Presenting for Surveillance EGD/Colonoscopy”, New Orleans, LA
- 05/05/23 Speaker, Society of Cardiovascular Anesthesiologists COR-PM Meeting, “Focusing on a Track record while simultaneously minimizing risk”, Portland, OR
- 05/06/23 Speaker, Society of Cardiovascular Anesthesiologists 2023 Annual Meeting & Workshops, “Pulmonary Hypertension: Old Disease, New Updates, and What That Means to Everyday Care to You!”, Portland, OR
- 05/07/23 Speaker, Society of Cardiovascular Anesthesiologists 2023 Annual Meeting & Workshops, “Pro/Con Debate: CT Anesthesiologists Should Take The Lead In Caring For ACHD Patients Undergoing Non-Cardiac Surgery”, Portland, OR
- 10/16/23 Speaker, American Society of Anesthesiology Annual Meeting: Anesthesiology 2023, “Tetralogy of Fallot, the former blue baby presenting as an adult”, San Francisco, CA
- 10/17/23 Speaker, American Society of Anesthesiology Annual Meeting: Anesthesiology 2023, “The latest insights into the perioperative management for patients with Pulmonary Hypertension”, San Francisco, CA
- Scheduled
- 10/2024 Speaker, “Tetralogy of Fallot, the former blue baby presenting as an adult”, American Society of Anesthesiology Annual Meeting: Anesthesiology 2024, Philadelphia, PA
- 10/2024 Speaker, “Should these patients been taken care of by a cardiac anesthesiologist?”, American Society of Anesthesiology Annual Meeting: Anesthesiology 2024, Philadelphia, PA
- 10/2024 Speaker, “The latest insights into the perioperative management for patients with Pulmonary Hypertension”, American Society of Anesthesiology Annual Meeting: Anesthesiology 2024, Philadelphia, PA
- International*
- 11/04/14 Speaker, Anesthesia Clinical Staff Meeting, “Perioperative Management of Cardiovascular Problems”, The First Hospital of Lanzhou, Lanzhou University, Lanzhou, Gansu Province, China
- 05/27/15 Speaker, 2015 Week of Healthcare of the SCO and BRICS countries, “Extracellular matrix changes underlying vascular stiffening”, Bashkir State Medical University, Ufa, Russia
- 05/31/15 Speaker, European Society of Anaesthesiology Annual Meeting: Euroanaesthesia 2015, “Outcomes of major non-cardiac surgery in adults with congenital heart disease”, Berlin, Germany
- 02/01/20 Speaker, Pulmonary Vascular Research Institute, PVRI World Congress on PVD, “The impact of LOXL2 on pulmonary arterial hypertension”, Peru, Lima
- 04/25/21 Speaker, Society of Cardiovascular Anesthesiologists 2021 Annual Meeting & Workshops, Plenary Session “Roadmap for the Perioperative Management of Patients with Pulmonary Hypertension”, Toronto, Canada (*virtual due to COVID-19*)
- 11/19/22 Speaker, XII Cuban Congress of Anesthesiology, Resuscitation and Pain “Pulmonary Hypertension, how it affects anesthesia management for non-cardiac surgery”, Havana, Cuba
- 04/29/24 Speaker, Society of Cardiovascular Anesthesiologists 2024 Annual Meeting & Workshops, “Staffing of the Heart Failure patient for non-cardiac surgery – Who? Where? Why? and How?”, Toronto, Canada
- 05/20/24 Speaker, MGH-Mayo-U Toronto Critical Care Echocardiography Consortium, “Perioperative management and echocardiographic evaluation of adult patients with congenital heart disease”, ICU fellows and junior attendings at the Massachusetts General Hospital (MGH), Mayo Clinic, and the University of Toronto (held virtually)
- Scheduled
- 11/2025 Speaker, 2025 3SCTS & IACA Meeting “Collaborating in cardiothoracic care: A deep dive, Down Under”. Sydney, Australia

## Visiting Professorships

### National:

- 10/29/14 Brigham and Women's Hospital – Boston, "Pathophysiology and clinical aspects of vascular stiffness"
- 01/13/15 Duke University – Durham, "Clinical consequences of vascular stiffness and the influence of tissue transglutaminase"
- 04/08/16 University of Maryland – Baltimore, "Anesthetic Considerations for the Adult with Congenital Heart Disease"
- 08/16/18 Thomas Jefferson University – Philadelphia, "Pulmonary Hypertension - mechanistic insights and clinical relevance" – Department of Anesthesiology Grand Rounds
- 11/08/19 Albert Einstein College of Medicine / Montefiore Medical Center – New York, "Pulmonary Hypertension – from bench to bedside"
- 06/10/21 Mercy Medical Center – Baltimore, "Perioperative Management of Pulmonary Hypertension – A vascular Disease with Clinical Impact"
- 10/04/21 Stanford – Palo Alto, "Pulmonary Hypertension – How a vasculopathy changes clinical management"
- 02/09/22 Brigham and Women's Hospital – Boston, "Pulmonary Hypertension Management – From bench to bedside"
- 08/16/22 University of Kansas Medical Center – Kansas City, "Pulmonary Hypertension Management – From bench to bedside"
- 07/07/23 Vanderbilt University – Nashville, "Perioperative Management of Pulmonary Hypertension – bench to bedside"

### International:

- 11/03/14 The First Hospital of Lanzhou, Lanzhou University – Lanzhou (Gansu Province, China), "Common Considerations and Anesthetic Management for Adults with Congenital Heart Disease"
- 11/07/14 Xijing Hospital, Fourth Military Medical University – Xian (Shanxi Province, China), "Common Considerations and Anesthetic Management for Adults with Congenital Heart Disease"
- 09/19/17 University of Heidelberg – Germany, "Ein systematischer Zugang zu Patienten mit komplexen kardialen Erkrankungen – Pulmonale Hypertonie" ("A systematic approach to patients with complex cardiac disease – pulmonary hypertension")
- 06/03/19 University of Munich – Germany, "Versorgung Erwachsener Patienten mit angeborenen Herzfehlern" ("Anesthetic care for adults with congenital heart disease")
- 05/07/20 Inselspital Bern, University Hospital – Switzerland, "Pulmonale Hypertension – Eine Erkrankung der Lunge, der Gefäße, und des Herzens" (Pulmonary hypertension – a disease of the lung, the vasculature, and the heart") (cancelled due to COVID-19)
- 02/19/21 Yodogawa Christian Hospital, Osaka – Japan, "Pulmonary Hypertension – How a vasculopathy affects clinical management" (held virtually due to COVID-19)
- 02/23/22 Inselspital Bern, University Hospital – Switzerland, "The implications of Pulmonary Hypertension for the Cardiothoracic Anesthesiologist" (held virtually due to COVID-19)
- 06/12/23 Uniklinikum Salzburg, University Hospital – Austria, "Pulmonale Hypertonie – Implikationen für Perioperatives Management" ("Pulmonary hypertension – implications for perioperative management")
- 03/12/24 Ljubljana University Medical Center – Slovenia, "Management of the child with pulmonary hypertension presenting for non-cardiac surgery – new scientific insights and guidance"
- 03/12/24 Ljubljana University Medical Center – Slovenia, "Perioperative management of the patient with Tetralogy of Fallot – from blue baby to adulthood"
- 08/29/24 German Heart Center at the Charité Berlin – Berlin, Germany, "Pulmonale Hypertension – Eine Erkrankung der Lunge, der Gefäße, und des Herzens" (Pulmonary hypertension – a disease of the lung, the vasculature, and the heart")
- 08/30/24 St. Bartholomew's Hospital – London, UK, "Perioperative Management of Pulmonary Hypertension – bench to bedside"