

CURRICULUM VITAE
The Johns Hopkins University School of Medicine

Jochen Steppan, MD, DESA, FAHA, FASA

August 23, 2021

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

Cardiac Anesthesia
Pediatric Anesthesia
Anesthesiology and Critical Care Medicine
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Baltimore, MD 21287

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Education and Training

- 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

Undergraduate

N/A

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. **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
4. 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
5. 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
6. 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
7. 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
8. 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
9. **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
10. 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
11. 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
12. **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 Glycocalyx. *J Surg Res*. 2011;165(1):136-41
13. 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

14. Khan M*, **Steppan J***, Schuleri K, Ryoo S, Tuday 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
15. 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
16. **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
17. **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
18. 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]
19. 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
20. 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
21. 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
22. 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]
23. **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)
24. 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
25. 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
26. 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)
27. **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
28. 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
29. **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
30. 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
31. 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
32. 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
33. **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

34. 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.
35. **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.
36. 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.
37. 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.
38. 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.
39. 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.
40. 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
41. 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
42. **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.
43. 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
44. **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
45. **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
46. **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
47. 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
48. 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
49. 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
50. Elassal 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
51. 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
52. 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 cellaging using a novel transamidation-deficient TGM2-C277S mouse model. *Cell Death Discov.* 2021 Jul 29;7(1):197

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

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

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, *in Press*

- 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, 4th edition, 2021, *in Press*

Editorials [ED]

- 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.
- 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
- 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.
- 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

Media Releases or Interviews [MR]

- Questions and answers cardiac anesthesia section of the anesthesia written board prep site “GasQuestions” GasQuestions, 2013, www.gasquestions.com, Editor David E Bravos
- Lecture 31, Heart Diseases and Anesthesia 1 (audio recording)
Audio-Digest Anesthesiology, 2nd edition, 2015, www.audio-digest.org, Project Manager Francesca Wright
- Lecture 32, Heart Diseases and Anesthesia 2, (audio recording)
Audio-Digest Anesthesiology, 2nd edition, 2015, www.audio-digest.org, Project Manager Francesca Wright
- Episode 59: Pulmonary Hypertension (audio recording, podcast, accrac.com)
AACRaC: Anesthesia and Critical Care Reviews and Commentary, by Jed Wolpaw
- Society of Cardiovascular Anesthesiologists published 38th Annual Meeting and Workshops syllabus, “The Patient with Pulmonary Hypertension for Non-Cardiac Surgery”, 2016
- American Society of Anesthesiology Review Course Lecture Syllabus, “Perioperative Management Strategies for Adults with Congenital Heart Disease Presenting for Non-cardiac Surgery”, 2016
- Heart Diseases and Anesthesia Part 1 (audio recording)
Audio-Digest Anesthesiology, 3rd edition, 2018, www.audio-digest.org, Project Manager Francesca Wright
- Heart Diseases and Anesthesia Part 2, (audio recording)
Audio-Digest Anesthesiology, 3rd edition, 2018, www.audio-digest.org, Project Manager Francesca Wright
- Society of Cardiovascular Anesthesiologists published 40th Annual Meeting and Workshops syllabus, “Severe Pulmonary Hypertension and Non-Cardiac Surgery”, 2018
- 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
- Society of Cardiovascular Anesthesiologists published 41st Annual Meeting and Workshops syllabus, “Severe Pulmonary Hypertension and Non-Cardiac Surgery”, 2019
- CV Podcast 19: Adult Congenital Heart Disease (ACHD), Anesthesia Education Toolbox,
<https://www.anesthesiatoolbox.com/videos/1648>, published 4/21/2020
- Society of Cardiovascular Anesthesiologists published 42nd Annual Meeting and Workshops syllabus, “Severe Pulmonary Hypertension and Non-Cardiac Surgery”, 2020
- Steppan, J.: Heart Diseases and Anesthesia Part 1. AudioDigest Anesthesiology 62:30 (August 14) 2020
- Steppan, J.: Heart Diseases and Anesthesia Part 2. AudioDigest Anesthesiology 62:30 (August 14) 2020
- Steppan, J.: Congenital Heart Disease. AudioDigest Anesthesiology 62:30 (August 14) 2020
- Steppan, J.: Pulmonary Hypertension. AudioDigest Anesthesiology 62:30 (August 14) 2020
- Editor, Frontiers Research Topic, “Cardiovascular Remodeling in Aging and Disease”, 2021
- Steppan, J et al, Youtube video. CVSA Council 2020-2021: Membership Testimonials,
<https://www.youtube.com/watch?v=XIYUBWvpLBs&t=450s>
- Society of Cardiovascular Anesthesiologists published 43rd Annual Meeting and Workshops syllabus, “Severe Pulmonary Hypertension and Non-Cardiac Surgery”, 2021
- Steppan J, Bulletin for the Chinese American Society of Anesthesiology, “A Perioperative Management Pathway for Patients with Pulmonary Hypertension”, August 2021
- Steppan, J.: Pulmonary Hypertension. AudioDigest Anesthesiology 63:31 (August 21) 2021

FUNDING

EXTRAMURAL Funding

Research Extramural Funding - Current

01/01/19 - 12/31/23 The therapeutic role of LOXL2 in pulmonary hypertension.
NIH – K08 Award
\$ 858,600
PI: Jochen Steppan, MD, DESA
Role, PI, 75% effort (salary support)

01/01/19 - 12/31/23 Lysyl oxidase like 2: A novel target in aging associated vascular stiffening.
NIH – R01 Award
\$ 2,215,020
PI: Lakshmi Santhanam, PhD
Role: CO-I, 0% effort (salary support)

Research Extramural Funding – Previous

07/01/18 - 06/30/20 The role of LOXL2 in Pulmonary hypertension
SCA/IARS Mid-Career Grant
\$ 100,000
PI: Jochen Steppan, MD, DESA
Role: PI, 1% 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)

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)

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)

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

01/01/21 - 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)

Research Intramural Funding – Previous

- 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)
- 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)
- 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)
- 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 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)

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 am spearheading the development of new evidence-based perfusion guidelines for pediatric cardiopulmonary bypass.

Certification

Medical, other state/government licensure

4/12 - present Maryland Medical License, renewed 2013, 2015, 2017, 2019, 2021

Boards, other specialty certification

- 2013 - Present Board Certified, American Board of Anesthesiology (#51386)
2013 - Present Examination of Special Competence in Advanced Perioperative Transesophageal Echocardiography (#2013-00025499)
2014 - Present European Diploma in Anaesthesiology (#N/A)

Clinical (Service) Responsibilities

- 2013 - 2017 Director Cardiac Anesthesia Morning Conference Series
2015 - Present Director of Perioperative Medicine, High Risk Cardiovascular Disease, 10%

Clinical Productivity

- 2013 - 2014 Targeted clinical effort assignment of 50%
2014 - 2016 Targeted clinical effort assignment of 20%
2016 - 2018 Targeted clinical effort assignment of 40%.
2016 - Present Targeted clinical effort assignment of 20%.

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

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

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

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, 38th 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 40th 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 41st 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 42nd Annual Meeting and Workshops, Palm Beach, FL (*cancelled due to COVID-19*)

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*)

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 42nd Annual Meeting and Workshops, Palm Beach, Fl (*cancelled due to COVID-19*)

Mentoring

Pre-doctoral Advisees /Mentees

- 2016 - present Marcel Rauer, medical thesis candidate, University of Muenster, Germany, mentor on his laboratory work for his medical thesis at Johns Hopkins.
- 2016 - 2019 Ravi Medikonda, medical student, Johns Hopkins University, Baltimore, currently in medical school, publication in review at World J Pediatr Congenit Heart Surg: "Best Practices in Pediatric Perfusion Strategies on Cardiopulmonary Bypass".
- 2020 - present 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 under review at *Vox Sanguinis*.
- 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", IRB obtained, data acquisition in process.

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, 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. Publication under review for World J Pediatr Congenit Heart Surg: "Best Practices in Pediatric Perfusion Strategies on Cardiopulmonary Bypass"
- 2016 - 2019 Ravi Medikonda, MS; MD student, Johns Hopkins University. 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; co-author RA 5
- 2017 - 2018 Nicolas Mottard, MD; Research Fellow, Johns Hopkins University; mentoring on cardiovascular physiology and experiments in rodent models

- 2018 - 2020 Youn-Hoa Jung, MD; obstetric anesthesia fellow. Currently cardiac anesthesia fellow Johns Hopkins University, poster at the SCA 41st 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, “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): “Developing a protocol to measure mouse pulmonary artery dimensions ex vivo”.
- 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”

Thesis committees

- 2016 - present Marcel Rauer, University of Muenster, Germany, “LOXL2 and vascular stiffening”, mentor, laboratory work medical thesis is done at Johns Hopkins.

RESEARCH ACTIVITIES

Research Focus

My longstanding research commitment over the last 14 years has continuously revolved around the cardiovascular system including endothelial dysfunction (nitric oxide signaling and the role of arginase), vascular changes in sepsis (the role of central sympatholytics), and basic pharmacology (signaling mechanisms and their underlying 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 smooth muscle cell behavior and tissue mechanics in models of pulmonary or systemic hypertension, as well as in aging. My research in the pulmonary vasculature, for which I received extramural funding, will potentially lead us to the discovery and characterization of a novel therapeutic target to prevent, treat, or even reverse vascular stiffness.

Research Demonstration Activities

- 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

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.
- 07/14 - present Core Faculty, Pulmonary Hypertension QI Project, Johns Hopkins Hospital, Baltimore, MD; the creation of a collaborative program lead 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

Editorial Activities

Editorial Board appointments

- 2017 - present Journal of Cardiothoracic and Vascular Anesthesia
- 2021 - present Frontiers in Physiology | Vascular Physiology

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*

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

- 2016 - present Abstract reviewer for Scientific Sessions, American Heart Association
- 2016 - present Abstract reviewer for ACCM StAAR grants, Johns Hopkins University
- 2016 - present 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 Session Proposal Review Panelist for the IARS 2022 Annual Meeting, Honolulu, HI

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 - present 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 - 2023 Member, International Committee, Society of Cardiovascular Anesthesiologists
- 2021 - 2022 Member, ASA Educational Track Subcommittee on Cardiac Anesthesia, American Society of Anesthesiology
- 2021 - 2023 Adjunct Member, ASA Committee on Research, American Society of Anesthesiology

Professional Societies

- 2004 - present American Heart Association (AHA)
 - 2004 - present Member
 - 2019 - present Fellow (FAHA)
- 2006 - 2012 Member, Deutsche Ärztgesellschaft 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]

Conference Organizer

JHMI/Regional

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

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

National

- 04/2020 Moderator, “Approaching adult congenital heart disease – From uncertain to fearless!”, Society of Cardiovascular Anesthesiologists 42nd Annual Meeting and Workshops, Palm Beach, FL (*cancelled due to COVID-19*)

Scheduled:
08/2021 Moderator, “Pulmonary Hypertension Master Class”, American Society of Anesthesiology Annual Meeting: Anesthesiology 2021, San Diego, CA

International
05/2015 Chair abstract session, Regional Anesthesia: Case Reports, Euroanaesthesia 2015, European Society of Anaesthesiology (ESA), Berlin, Germany

RECOGNITION

Awards, Honors

2006 German Acupuncture Award 2006 for best research study, Deutsche Ärztegesellschaft 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 price 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

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*)

National

- 10/25/16 Speaker, Review 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 31st 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 40th 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 41st Annual Meeting, “Perioperative Management Concepts for Adults with Congenital Heart Disease – Keys to Success”, Chicago, IL
- 05/21/19 Speaker, Society of Cardiovascular Anesthesiologists 41st 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*)
- Scheduled:
- 08/10/21 Speaker, American Society of Anesthesiology Annual Meeting: Anesthesiology 2021, “The latest insights into the perioperative management of patients with Pulmonary Hypertension”, San Diego, CA
- 08/12/21 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

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*)

Visiting Professorships

- 10/29/14 Brigham and Women’s Hospital – Boston, “Pathophysiology and clinical aspects of vascular stiffness”
- 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”
- 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”
- 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”)
- 08/16/18 Thomas Jefferson University – Philadelphia, “Pulmonary Hypertension - mechanistic insights and clinical relevance” – Department of Anesthesiology Grand Rounds
- 06/03/19 University of Munich – Germany, “Versorgung Erwachsener Patienten mit angeborenen Herzfehlern” (“Anesthetic care for adults with congenital heart disease”)
- 11/08/19 Albert Einstein College of Medicine / Montefiore Medical Center – New York, “Pulmonary Hypertension – from bench to bedside”
- 05/07/20 Inselspital Bern, University Hospital – Switzerland, “Pulmonale Hypertonie – 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*)
- 06/10/21 Mercy Medical Center – Baltimore, “Perioperative Management of Pulmonary Hypertension – A vascular Disease with Clinical Impact”
- Scheduled:
10/04/21 Stanford – Palo Alto, “Pulmonary Hypertension – How a vasculopathy changes clinical management”