CURRICULUM VITAE
The Johns Hopkins University School of Medicine

15 October 2022
James Courtney Fackler, MD   Date

DEMOGRAPHIC AND PERSONAL INFORMATION

Current Appointments
2022–present   Professor, Departments of Anesthesiology and Critical Care Medicine and Pediatrics
2020-present   Affiliate Faculty, The Malone Center for Engineering in Healthcare, Johns Hopkins University

Personal Data
> Department of Anesthesiology and Critical Care Medicine
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Education and Training
Undergraduate
1975   BS, Biology; University of Illinois, Urbana, IL
1977–1978   Post-sophomore fellowship in Pathology; Rush Medical College, Chicago; Ronald Weinstein, MD, Chairman

Doctoral/graduate
1980   MD, Medicine; Rush Medical College, Chicago, IL

Postdoctoral
1980–1983   Internship and Residency, Pediatrics; Department of Pediatrics, The Johns Hopkins University School of Medicine, Baltimore, MD
1984–1987   Residency, Anesthesiology; Department of Anesthesiology/Critical Care Medicine, The Johns Hopkins University School of Medicine, Baltimore, MD
1985–1986   Fellow, Pediatric Intensive Care; Department of Anesthesiology/Critical Care Medicine, The Johns Hopkins University School of Medicine, Baltimore, MD
1987   Fellow, Pediatric Anesthesia; Department of Anesthesiology/Critical Care Medicine, The Johns Hopkins University School of Medicine, Baltimore, MD
2012   Certificate, Agent-based Modeling; Institute on Systems Science and Health, National Institutes of Health, Bethesda, MD
2013   Certificate, Clinical Investigation; Johns Hopkins University School of Public Health, Baltimore, MD
2018   Certificate, Hexcite Early Stage Accelerator Program, Technology Innovation Center, Johns Hopkins Medicine, Baltimore, MD
2018   Certificate, Center of Excellence Analytics in Medicine Program, Technology Innovation Center, Johns Hopkins Medicine, Baltimore, MD
2020   Certificate, Leading Transformation for Value-based Health Care: Executive Education Program, The Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

Professional Experience

1983–1984	Instructor, Department of Pediatrics, The Johns Hopkins University School of Medicine, Baltimore, MD
1987-1988	Instructor, Department of Anesthesia (Pediatrics), University of Maryland Medical School, Baltimore, MD
1988–1989	Instructor, Department of Anesthesia, Harvard Medical School, Boston, MA
1989–1993	Instructor, Department of Anesthesia (Pediatrics), Harvard Medical School, Boston, MA
1993–1996	Assistant Professor, Department of Anesthesia (Pediatrics), Harvard Medical School, Boston, MA
1996–1999	Assistant Professor, Department of Anesthesiology/Critical Care Medicine, The Johns Hopkins University School of Medicine, Baltimore, MD
1999–2002	Associate Professor, Department of Anesthesiology/Critical Care Medicine, The Johns Hopkins University School of Medicine, Baltimore, MD
2002–2003	Health Care Executive, Cerner Corporation, Kansas City, MO
2002–2006	Part-time Associate Professor, Department of Anesthesiology/Critical Care Medicine, The Johns Hopkins University School of Medicine, Baltimore, MD
2003–2006	Director, Cerner Critical Care, Cerner Corporation, Kansas City, MO
2006–2006	Vice President, National Pediatrics and Academic Hospital Information Systems, Cerner Corporation, Kansas City, MO
2006–2022	Associate Professor, Department of Anesthesiology/Critical Care Medicine, The Johns Hopkins University School of Medicine, Baltimore, MD
2008–2014	Founder, Oak Clinical Informatics Systems, Baltimore, MD
2014-2021	Associate Professor, by Courtesy, Johns Hopkins Carey Business School
	2017-present Founder, Rubicon Health, Baltimore, MD

PUBLICATIONS

Original Research [OR]
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1. **Fackler JC**, Nagel JE, Adler WH, Mildvan PT, Ambinder FR. Epstein-Barr virus infection in a child with acquired immunodeficiency syndrome. Am J Dis Child 1985;139:1000-4.
2. **Fackler JC**, Rogers MC. Is brain death really cessation of all intracranial function? J Pediatr 1987;110:84-6.
3. Ackerman AD, **Fackler JC***, Tuck-Muller CM, Tarpey MM, Freeman BA, Rogers MC. Partial monosomy 21, diminished activity of superoxide dismutase, and pulmonary oxygen toxicity. N Engl J Med 1988;318:1666-9. *Co-First Author
4. **Fackler JC**, Troncoso JC, Gioia FR. Age-specific characteristics of brain death in children. Am J Dis Child 1988;142:999-1003.
5. Tobias JD, Deshpande JK, Wetzel RC, **Fackler J**, Maxwell LG, Solca M. Postoperative analgesia. Use of intrathecal morphine in children. Clin Pediatr 1990;29:44-8.
6. Truog RD, **Fackler JC**. Is it reasonable to reject the diagnosis of brain death. J Clin Ethics 1992;3:80-1.
7. Truog RD, **Fackler JC**. Rethinking brain death. Crit Care Med 1992;20:1705-13.
8. Kirkland LL, Freer JP, Truog RD, **Fackler JC**, Bartholme WG, Morgan H. Brain death and the termination of life support: Case and analysis. J Clin Ethics 1992;3:78-82.
9. **Fackler JC**, Berkowitz ID, Green WR. Retinal hemorrhages in newborn piglets following cardiopulmonary resuscitation. Am J Dis Child 1992;146:1294-6.
10. Wilson JM, Bower LK, **Fackler JC**, Beals DA, Bergus BO, Kevy SV. Aminocaproic acid decreases the incidence of intracranial hemorrhage and other hemorrhagic complications of ECMO. J Pediatr Surg 1993;28:536-40.
11. Arnold JH, Truog RD, Thompson J, **Fackler JC**. High-frequency oscillatory ventilation in pediatric respiratory failure. Crit Care Med 1993;21:272-8.

12. Aoki M, Nomura F, Stromski ME, Tsuji MK, **Fackler JC**, Hickey PR, Holtzman DH, Jonas RA. Effects of pH on brain energetics after hypothermic circulatory arrest. Ann Thorac Surg 1993;55:1093-103.

13. Kawata H, **Fackler JC**, Aoki M, Tsuji MK, Sawatari K, Offutt M, Hickey PR, Holtzman D, Jonas RA. Recovery of cerebral blood flow and energy state in piglets after hypothermic circulatory arrest versus recovery after low-flow bypass. J Thorac Cardiovasc Surg 1993;106:671-85.

14. Gaston B, Reilly J, Drazen JM, **Fackler J**, Ramdev P, Arnelle D, Mullins ME, Sugarbaker DJ, Chee C, Singel DJ, Loscalzo J, Stamler JS. Endogenous nitrogen oxides and bronchodilator S-nitrosothiols in human airways. Proc Natl Acad Sci 1993;90:10957-61.

15. Aoki M, Nomura F, Stromski ME, Tsuji MK, **Fackler JC**, Hickey PR, Holtzman DH, Jonas RA. Effects of MK-801 and NBQX on acute recovery of piglet cerebral metabolism after hypothermic circulatory arrest. J Cereb Blood Flow Metab 1994;14:156-65.

16. DiFiore JW, Fauza DO, Slavin R, Peters CA, **Fackler JC**, Wilson JM. Experimental fetal tracheal ligation reverses the structural and physiologic effects of pulmonary hypoplasia in congenital diaphragmatic hernia. J Pediatr Surg 1994;29:248-56.

17. Adatia I, Lillehei C, Arnold JH, Thompson JE, Palazzo R, **Fackler JC**, Wessel DL. Inhaled nitric oxide in the treatment of postoperative graft dysfunction after lung transplantation. Ann Thorac Surg 1994;57:1311-8.

18. Timmons OD, Havens PL, **Fackler JC**. Predicting death in pediatric patients with acute respiratory failure. Pediatric Critical Care Study Group. Extracorporeal Life Support Organization. Chest 1995;108:789-97.

19. Waisel DB, **Fackler JC***, Brunner JX, Kohane I. PEFIOS: an expert closed-loop oxygenation algorithm. Medinfo 1995;8:1132-6. *Co-First Author

20. Green TP, Timmons OD, **Fackler JC**, Moler FW, Thompson AE, Sweeney MF. The impact of extracorporeal membrane oxygenation on survival in pediatric patients with acute respiratory failure. Crit Care Med 1996;24:323-9.

21. Kohane IS, Greenspun P, **Fackler J**, Cimino C, Szolovits P. Building national electronic medical record systems via the World Wide Web. J Am Med Inform Assoc 1996;3:191-207.

22. Wilson JM, Bower LK, Thompson JE, Fauza DO, **Fackler JC**. ECMO in evolution: The impact of changing patient demographics and alternative therapies on ECMO. J Pediatr Surg 1996;31:1116-22.

23. Tsien CL, **Fackler JC**. Poor prognosis for existing monitors in the intensive care unit. Crit Care Med 1997:614-9.

24. Nobuhara KK, Fauza DO, DiFiore JW, Hines MH, **Fackler JC**, Slavin R, Hirschl R, Wilson JM. Continuous intrapulmonary distension with perfluorocarbon accelerates neonatal (but not adult) lung growth. J Pediatr Surg 1998;33:292-8.

25. Curley MAQ, **Fackler JC**. Weaning from mechanical ventilation: Patterns in young children recovering from acute hypoxemic respiratory failure. Am J Crit Care 1998;7:335-45.

26. Hardart GE, **Fackler JC**. Predictors of intracranial hemorrhage during neonatal extracorporeal membrane oxygenation. J Pediatr 1999;134:156-9.

27. Morrison WE, Haas EC, Shaffner DH, Garrett ES, **Fackler JC**. Noise, stress, and annoyance in a pediatric intensive care unit. Crit Care Med 2003;31:113-9.

28. Morrison WE, Arbelaez JJ, **Fackler JC**, De Maio A, Paidas CN. Gender and age effects on outcome after pediatric traumatic brain injury. Pediatr Crit Care Med 2004;5:145-51.

29. White JR, Veltri MA, **Fackler JC**. Preventing adverse events in the pediatric intensive care unit: Prospectively targeting factors that lead to intravenous potassium chloride order errors. Pediatr Crit Care Med 2005;6:25-32.

30. Curley MA, Arnold JH, Thompson JE, **Fackler JC**, Grant MJ, Fineman LD, Cvijanovich N, Barr FE, Molitor-Kirsch S, Steinhorn DM, Matthay MA, Hibberd PL; for the Pediatric Prone Positioning Study Group. Clinical trial design–effect of prone positioning on clinical outcomes in infants and children with acute respiratory distress syndrome. J Crit Care. 2006;21:23-32.

31. Bayrakci B, Josephson C, **Fackler J**. Oxygenation index for extracorporeal membrane oxygenation: Is there predictive significance? J Artif Organs 2007;10:6-9.

32. **Fackler JC**, Watts C, Grome A, Miller T, Crandall B, Pronovost P. Critical care physician cognitive task analysis: An exploratory study. Crit Care 2009;13:R33.

33. Williams M, F. Wu F, Kazanzides P, Brady K, **Fackler J.** A modular framework for clinical decision support systems: medical device plug-and-play is critical. SIGBED Rev. 6;2; Article 8 2009.
34. Spaeder MC, **Fackler JC**. Time series model to predict burden of viral respiratory illness on a pediatric intensive care unit. Med Decis Making 2011;31:494-9.
35. Spaeder MC, Milstone AM, **Fackler JC**. Association of bacterial pneumonia and respiratory failure in children with community-acquired influenza infection. Pediatr Crit Care Med 2011;12:e181-3.
36. Spaeder MC, **Fackler JC**. Hospital-acquired viral infection increases mortality in children with severe viral respiratory infection. Pediatr Crit Care Med. 2011;12:e317-21.
37. Spaeder MC, Lockman JL, Greenberg RS, **Fackler JC***, Shay J. Impact of perioperative RSV or influenza infection on length of stay and risk of unplanned ICU admission in children: A case-control study. BMC Anesthesiol 2011;11:16. *Co-Senior Author
38. Spaeder MC, **Fackler JC**. A multi-tiered time-series modelling approach to forecasting respiratory syncytial virus incidence at the local level. Epidemiol Infect 2012;140:602-7.
39. Custer JW, White E, **Fackler JC**, Xiao Y, Tien A, Lehmann H, Nichols DG. A qualitative study of expert and team cognition on complex patients in the pediatric intensive care unit. Pediatr Crit Care Med 2012;13:278-84.
40. Ordóñez P, Oates T, Lombardi M, Hernandez G, Holmes KW, **Fackler J***, Lehmann CU. Visualization of multivariate time series data in a neonatal ICU. IBM J Res Dev 2012;56(5) Paper 7. *Co-Senior Author
41. Levin SR, Harley ET, **Fackler JC**, Lehmann CU, Custer JW, France D, Zeger SL. Real-time forecasting of pediatric intensive care unit length of stay using computerized provider orders. Crit Care Med 2012; 40(11):3058-64.
42. Scharnweber C, Mollenkopf NL, **Fackler J**, Dover GJ, Lehmann CU. Utilizing electronic health record data to determine the health of the medication process after the relocation of a children's hospital. Stud Health Technol Inform 2013;192:210-4.
43. Casamassima MGS, Salazar JH, Papandria D, **Fackler J**, Chrouser K, Boss EF, Abdullah F. Use of risk stratification indices to predict mortality in critically ill children. Eur J Pediatr 2014;173(1):1-13.
44. Cifra CL, Bembea MM, **Fackler JC***, Miller MR. The morbidity and mortality conference in PICUs in the United States: A national survey. Crit Care Med 2014;42(10):2252-7. *Co-Senior Author
45. Cifra CL, Jones KL, Ascenzi J, Bhalala US, Bembea MM, **Fackler JC***, Miller MR. The morbidity and mortality conference as an adverse event surveillance tool in a paediatric intensive care unit. BMJ Qual Saf 2014;23(11):930-8. *Co-Senior Author
46. Kelen GD, Sauer L, Clattenburg E, Lewis-Newby M, **Fackler J**. Pediatric disposition classification (reverse-triage) system to create surge capacity. Disaster Med Public Health Prep. 2015;9(3):283-90.
47. Cifra CL, Jones KL, Ascenzi JA, Bhalala US, Bembea MM, Newman-Toker DE, **Fackler JC***, Miller MR. Diagnostic errors in a PICU: Insights from the morbidity and mortality conference. Pediatr Crit Care Med. 2015;16(5):468-76. *Co-Senior Author
48. Miller KM, Kim AY, Yaster M, Kudchadkar SR, White E, **Fackler J***, Monitto CL. Long-term tolerability of capnography and respiratory inductance plethysmography for respiratory monitoring in pediatric patients treated with patient-controlled analgesia. Paediatr Anaesth. 2015;25(10):1054-9. *Co-Senior Author
49. Klaus SA, Frank SM, Salazar JH, Stacy Cooper S, Beard L, Abdullah F, **Fackler JC**, Heitmiller ES, Ness PM, Resar LMS. Hemoglobin thresholds for transfusion in pediatric patients at a large academic health center. Transfusion 2015;55(12):2890-7.
50. Cifra CL, Bembea MM, **Fackler JC***, Miller MR. Transforming the morbidity and mortality conference to promote safety and quality in a pediatric intensive care unit. Pediatr Crit Care Med 2016;17(1):58-66. *Co-Senior Author
51. Woods-Hill C, **Fackler J***, Nelson McMillan K, Ascenzi J, Martinez D, Toerper M, Voskertchian A, Colantuoni E, Klaus S, Levin S, Aaron Milstone. Association of a clinical practice guideline with blood culture use in critically ill children. JAMA Pediatr. 2017;171(2):157-64. *Co-First Author
52. Kelen GD, Troncoso R, Treback J, Levin S, Cole G, Delaney CM, Jenkins, JL, **Fackler J**, Sauer L. Effect of reverse triage on creation of surge capacity in a pediatric hospital. JAMA Pediatr. 2017; 171(4):e164829

53.   Akinboyo I, <u>Sick-Samuels AC</u>, Singeltary E, **Fackler J**, Ascenzi J, Carroll KC, Maldonado Y, Brooks RB, Benowitz I, Wilson LE, LiPuma JL, Milstone AM. Multistate outbreak of an emerging Burkholderia cepacia complex strain associated with contaminated oral liquid docusate sodium. Infect Control Hosp Epidemiol. 2018;39(2);237-9.

54.   O'Hara S, Klar RT, Patterson ES, Ascenzi J, **Fackler JC***. Perry DJ. Macrocognition in the health care built environment (HCBE) focused ethnographic study of "neighborhoods" in a pediatric intensive care unit. HERD. 2018;11(2):104-23. *Co-Senior Author

55.   Xie A, Woods-Hill CZ, King AF, Enos-Graves H, Ascenzi J, Gurses AP, Klaus SA, **Fackler JC**, Milstone AM. Work system assessment to facilitate the dissemination of a quality improvement program for optimizing blood culture use: a case study using a human factors engineering approach. J Pediatr Infect Dis Soc. 2019;8(1):39-45

56.   Durojaiye AB, McGeorge MN, Puett LL, Dylan Stewart D, **Fackler JC**, Hoonakker P, Lehmann HP, Gurses, AP. Mapping the flow of pediatric trauma patients using process mining. Appl Clin Inform. 2018;9(3):654-66.

57.   <u>Woods-Hill CZ</u>, Lee L, Xie A, King AF, Voskertchian A, Klaus SA, Smith MM, Miller MR, Colantuoni EA, **Fackler JC**, Milstone AM. Dissemination of a novel framework to improve blood culture use in pediatric critical care. Pediatr Qual Saf 2018;3(5):e112.

58.   Hose B-Z, Hoonakker PLT, Wooldridge AR, Brazelton T, Dean SM, Eithun B, **Fackler J**, Gurses AP, Kelly MM, Kohler JE, McGeorge NM, Ross JC, Rusy DA, Carayon P. Physician perceptions of the electronic problem list in pediatric trauma care. Appl Clin Inform. 2019;10(1):113-22.

59.   <u>Sick-Samuels AC</u>, Woods-Hill CZ, **Fackler JC**, Tamma PD, Klaus SA, Colantuoni EE, Milstone AM. Association of a blood culture utilization intervention on antibiotic use in a pediatric intensive care unit. Infect Control Hosp Epidemiol. 2019;40(4):482-4.

60.   <u>Liu R</u>, Greenstein JL, Granite SJ, **Fackler JC**, Bembea MM, Sarma SV, Winslow RL. Data-driven discovery of a novel sepsis pre-shock state predicts impending septic shock in the ICU. Sci Rep 2019;9(1):6145.

61.   Marsillio LE, Asaro LA, Srinivasan V, Wypij D, Sorce LR, Agus MSD, Nadkarni VM; **Heart and Lung Failure-Pediatric Insulin Titration (HALF-PINT) Study Investigators**. Outcomes associated with multiple organ dysfunction syndrome in critically ill children with hyperglycemia. Pediatr Crit Care Med 2019;20(12):1147-56.

62.   Srinivasan V, Hasbani NR, Mehta NM, Irving SY, Kandil SB, Allen HC, Typpo KV, Cvijanovich NZ, Faustino EVS, Wypij D, Agus MSD, Nadkarni VM; **Heart and Lung Failure-Pediatric Insulin Titration (HALF-PINT) Study Investigators**. Early enteral nutrition is associated with improved clinical outcomes in critically ill children: a secondary analysis of nutrition support in the heart and lung failure-pediatric insulin titration trial. Pediatr Crit Care Med 2020; 21:213–21.

63.   Woods-Hill CZ, Koontz DW, King AF, Voskertchian A, Colantuoni EA, Miller MR, **Fackler JC**, Bonafide, CP, Milstone AM, Xie A, and the BrightStar Authorship group. Practices, perceptions, and attitudes in the evaluation of critically ill children for bacteremia: a national survey. Pediatr Crit Care Med 2020;21(1):e23-e29.

64.   <u>Sick-Samuels AC</u>, **Fackler JC**, Berenholtz SM, Milstone AM. Understanding reasons clinicians obtained endotracheal aspirate cultures and impact on patient management to inform diagnostic stewardship initiatives. Infect Control Hosp Epidemiol 2020;41(2):240-2.

65.   Dalesio NM, Lester LC, Barone B, Deanehan JK, **Fackler JC**. Real-time emergency airway consultation via telemedicine: instituting the Pediatric Airway Response Team board! Anesth Analg. 2020; 130(4):1097-102.

66.   Biagas KV, Hinton VJ, Hasbani NR, Luckett PM, Wypij D, Nadkarni VM. Agus MSD, **Heart and Lung Failure-Pediatric Insulin Titration (HALF-PINT) Study Investigators**, the PALISI Network. Long-term neurobehavioral and quality of life outcomes of critically ill children after glycemic control. J Pediatr. 2020;218:57–63.

67.   Xie A, Koontz DW, Voskertchian A, **Fackler JC**, Milstone AM, Woods-Hill CZ. Survey-based work system assessment to facilitate large-scale dissemination of healthcare quality improvement programs. Pediatr Qual Saf. 2020;5(2):e288.

68. Hoops KEM, **Fackler JC**, King A, Colantuoni E, Milstone AM, Woods-Hill CZ. How good is our diagnostic intuition? Clinician prediction of bacteremia in critically ill children. BMC Med Inform Decis Mak. 2020;20(1):144. doi: 10.1186/s12911-020-01165-3.

69. Liu R, Greenstein JL, **Fackler JC**, Bembea MM, Winslow RL. Spectral clustering of risk score trajectories stratifies sepsis patients by clinical outcome and interventions received. eLife. 2020;9:e58142.

70. LaMarra D, French J, Bailey C, Sisko MT, Coughlin-Wells K, Agus MSD, Srinivasan V, Nadkarni VM, **Heart and Lung Failure-Pediatric Insulin Titration (HALF-PINT) Study Investigators**. A novel framework using remote telesimulation with standardized parents to improve research staff preparedness for informed consent in pediatric critical care research*. Pediatr Crit Care Med. 2020; 21, e1042-e1051.

71. Jalali A, Lonsdale H, Zamora LV, Ahumada L, Nguyn ATH, Rehman M, **Fackler J**, Stricker PA, Fernandez AM, for the Pediatric Craniofacial Collaborative Group. Machine learning applied to registry data: Development of a patient-specific prediction model for blood transfusion requirements during craniofacial surgery using the Pediatric Craniofacial Perioperative Registry dataset. Anesth Analg. 2021;132(1):160-171.

72. Sick-Samuels AC, Linz M, Bergmann J, **Fackler JC**, Berenholtz SM, Ralston SL, Hoops K, Dwyer J, Colantuoni E, Milstone AM. Diagnostic stewardship of endotracheal aspirate cultures in a PICU. Pediatrics. 2021;147(5):e20201634.

73. Woods-Hill CZ, Koontz DW, Voskertchian A, Xie A, Shay J, Miller MR, Fackler JC, Milstone AM, and the BrightStar Authorship group. Consensus recommendations for blood culture use in critically ill children: a modified Delphi approach. Pediatr Crit Care Med. 2021;22(9):774-84.

74. Hirshberg EL, Alexander JL, Asaro LA, Coughlin-Wells K, Steil GM, Spear D, Stone C, Nadkarni VM, Agus MSD; **HALF-PINT Study Investigators**. Performance of an electronic decision support system as a therapeutic intervention during a multicenter PICU clinical trial: Heart and Lung Failure-Pediatric Insulin Titration trial (HALF-PINT). Chest. 2021;160(3):919-28.

75. Liu R, Greenstein JL, **Fackler JC**, Bergmann J, Bembea MM, Winslow RL. Prediction of impending septic shock in children with sepsis. Crit Care Explor. 2021;3(6):e0442.

76. Bose SN, Greenstein JL, **Fackler JC**, Sarma SV, Winslow RL, Bembea MM. Early prediction of multiple organ dysfunction in the pediatric intensive care unit. Front Pediatr. 2021;9:711104. DOI: 10.3389/fped.2021.711104

77. Booth LD, Sick-Samuels AC, Milstone AM, **Fackler JC**, Gnazzo LK, Stockwell DC. Culture ordering for patients with new-onset fever: A survey of pediatric intensive care unit clinician practices. Pediatr Qual Saf. 2021;6(5):e463.

78. Krachman JA, Patricoski JA, Le CT, Park J, Zhang R, Gong KD, Gangan I, Winslow RL, Greenstein JL, **Fackler J**, Sochet, AA Bergmann, JP. Predicting flow rate escalation for pediatric patients on high flow nasal cannula using machine learning. Front Pediatr. 9:734753. DOI: 10.3389/fped.2021.734753.

--   Liu R, Greenstein JL, **Fackler JC**, Bergmann J, Bembea MM, Winslow RL. Offline reinforcement learning with uncertainty for treatment strategies in sepsis. arXiv:2107.04491

79. Durojaiye AB, **Fackler JC**, McGeorge N, Webster K, Kharrazi H, Gurses AP. Examining diurnal differences in multidisciplinary care teams at a pediatric trauma center using EHR Data: Social Network Analysis. J Med Internet Research. 2022 Feb 4;24(2):e30351.

80. Woods-Hill CZ, Colantuoni EA, Koontz DW, Voskertchian A, Xie A, Thurm C, Miller MR, **Fackler JC**, Milstone AM and the Bright STAR Authorship Group. Association of Diagnostic Stewardship for Blood Cultures in Critically Ill Children With Culture Rates, Antibiotic Use, and Patient Outcomes: Results of the Bright STAR Collaborative. JAMA Pediatr. 2022 May 2. doi: 10.1001/jamapediatrics.2022.1024. Epub ahead of print. PMID: 35499841.

81. Vasey B, Nagendran M, Campbell B, Clifton DA, Collins GS, Denaxas S, Denniston AK, Faes L, Geerts B, Ibrahim M, Liu X, Mateen BA, Mathur P, McCradden MD, Morgan L, Ordish J, Rogers C, Saria S, Ting DSW, Watkinson P, Weber W, Wheatstone P, McCulloch P; **DECIDE-AI expert group**. Reporting guideline for the early-stage clinical evaluation of decision support systems driven by artificial intelligence: DECIDE-AI. BMJ. 2022 May 18;377:e070904. doi: 10.1136/bmj-2022-070904. PMID: 35584845.

--   Tan YY, Young MA, Girish A, Hu B, Kurian Z, Greenstein JL, Kim H, Winslow R, **Fackler J**, Bergmann J. Predicting Respiratory Decompensation in Mechanically Ventilated Adult ICU Patients medRxiv 2022.02.01.22270119; doi:https://doi.org/10.1101/2022.02.01.22270119

Review articles [RA]
1.   **Fackler JC**. Smart Alarms: from data to information. Int J Intensive Care 1998; S54-7.
2.   **Fackler JC**. Future ARDS therapies. Respir Care 1998;43:988-94.
3.   Dorman T, **Fackler J**. Automated information systems in anesthesiology. Int Anesthesiol Clin 2000;38:105-13.
4.   **Fackler J**. The future electronic medical record. Part 1 Mo Med 2006;103:119-23.
5.   **Fackler J**. The future electronic medical record. Part 2 Mo Med 2006;103:209-13.
6.   Friedman LN, Halpern NA, **Fackler JC**. Implementing an electronic medical record. Crit Care Clin 2007;23:347-81.
7.   Custer J, Spaeder M, **Fackler J**. Critical care decision support. Contemp Crit Care 2008;6(1):1-9.
8.   Sapirstein A, Lone N, Latif A, **Fackler J**, Pronovost PJ. Tele ICU: Paradox or panacea? Best Pract Res Clin Anaesthesiol 2009;23:115-26.
9.   Cifra CL, Custer JW, Singh H, **Fackler JC**. Diagnostic errors in pediatric critical care: a systematic review. Pediatr Crit Care Med. 2021;22(8):701-12.
10. Cifra CL, Custer JW, **Fackler JC**. A research agenda for diagnostic excellence in critical care medicine. Crit Care Clin. 2022 Jan;38(1):141-157

Book Chapters [BC]
1.   Arnold JH, **Fackler JC**. Anesthesia and critical care medicine. In: Fuhrman B, Zimmerman J, eds. Pediatric Critical Care. St. Louis: Mosby Year Book, Inc., 1992.
2.   **Fackler JC**, Commentator. Stockman JA III, ed. Year Book of Pediatrics, St. Louis: Mosby-Year Book, Inc., 1992;5:143.
3.   **Fackler JC**, Yaster M. Multiple trauma in the pediatric patient. In: Rogers MC, ed. Textbook of Pediatric Intensive Care, 2nd Edition, Baltimore: Williams & Wilkins, 1992.
4.   **Fackler JC**, Contributor. Aoki BY and McCloskey K, eds. Evaluation, Stabilization, and Transport of the Critically Ill Child, Baltimore: Mosby Year Book, Inc, 1992.
5.   Burns J, Perez A, **Fackler J**. Fatal inborn error of metabolism presenting as myocardial failure in a neonate. In: Rogers MC, Helfaer M, eds. Casebook of Pediatric Intensive Care. Baltimore: Williams & Wilkins, 1993.
6.   **Fackler J**. Increased intracranial pressure. In: Roberts KB, ed. Manual of Pediatrics, 4th Edition, Boston: Little Brown, 1994.
7.   **Fackler J**, Custer J. Selection of children for ECLS. In: Zwischenberger JB, Bartlett RH, eds. ECMO: Extracorporeal Cardiopulmonary Support in Critical Care. Ann Arbor: Univ of Mich Press, 1996.
8.   **Fackler JC**, Arnold JH, Nichols D. Rogers MC. Acute respiratory distress syndrome. In Rogers MC, ed. Textbook of Pediatric Intensive Care, 3rd Edition, Baltimore: Williams & Wilkins, 1996.
9.   Levy MS, **Fackler J**. ECMO. In: Stark A, Cloherty J, eds. Manual of Newborn Care; Boston: Little Brown, 1997.
10. **Fackler JC**, Arnold JH. Anesthesia and critical care medicine. In: Fuhrman BP, Zimmerman JJ, eds. Pediatric Critical Care, 2nd Edition. St. Louis: Mosby Year Book, Inc., 1997.
11. Wadia R, **Fackler J**. Anesthesia for the pediatric patient with intracranial hypertension. In: Lockman J, ed. Special Topics in Pediatric Anesthesiology, Pediatric Anesthesiology Review Topics (PART). Naerthwyn Press, LLC, 2013.
12. **Fackler J**. Beyond current HIMS: Future visions and a roadmap. In: Weaver C, ed. Healthcare Information Management Systems: Cases, Strategies, and Solutions. New York: Springer International, 2015.
13. **Fackler J,** Jackson E. Overview of current artificial intelligence. In: Matheny M, Thadaney S. eds. Artificial Intelligence (AI) and Machine Learning (ML) in Health Care. Washington DC: National Academy of Medicine. 2019. *Invited by the National Academy of Medicine*

Books, Textbooks [BK]

1. **Fackler JC**, Associate editor. Rogers MC, ed. Textbook of Pediatric Intensive Care, 2nd Edition, Baltimore: Williams & Wilkins, 1992.
2. **Fackler JC**, Associate editor. Rogers MC, ed. Textbook of Pediatric Intensive Care, 3rd Edition, Baltimore: Williams & Wilkins, 1996.
3. Doshi-Velez F, **Fackler J**, Kale D, Wallace B, Wiens J (editors). Proceedings of Machine Learning Research. Volume 56: Machine Learning for Healthcare Conference, 19-20 August 2016, Children's Hospital LA, Los Angeles, CA, USA
4. Doshi-Velez F, **Fackler J**, Kale D, Ranganath R. Wallace B, Wiens J (editors). Proceedings of Machine Learning Research. Volume 68: Machine Learning for Healthcare Conference, 18-19 August 2017, Boston, MA, USA
5. Doshi-Velez F, **Fackler J**, Jung K, Kale D, Ranganath R. Wallace B, Wiens J (editors). Proceedings of Machine Learning Research. Volume 85: Machine Learning for Healthcare Conference, 17-18 August 2018, Palo Alto, CA, USA
6. Doshi-Velez F, **Fackler J**, Jung K, Kale D, Ranganath R. Wallace B, Wiens J (editors). Proceedings of Machine Learning Research. Volume 106: Machine Learning for Healthcare Conference, 9-10 August 2019, Ann Arbor, MI, USA
7. Doshi-Velez F, **Fackler J**, Jung K, Kale D, Ranganath R. Wallace B, Wiens J (editors). Proceedings of Machine Learning Research. Volume TBD: Machine Learning for Healthcare Conference, 7-8 August 2020, Virtual, USA

Proceedings Reports [PR]
1. Shannon T, Truog R, Harmon W, **Fackler J**. A prospective analysis of creatinine clearance during ECMO and ultrafiltration. J Extracorporeal Tech 1992;23(3):90-3.
2. **Fackler JC**, Truog BT. Life, death, and solid organ transplantation without brain death. Crit Care Med 1993;21:S356-7.
3. Truog BT, **Fackler JC**. Withdrawing mechanical ventilation. Crit Care Med 1993;21:S396-7.
4. **Fackler JC**, Kohane I. Integration of sparse data from a clinical workstation with continuous data from bedside monitors. In: Kriewall TJ ed. Proceedings of the sixth annual IEEE computer-based medical systems symposium. Washington: IEEE Computer Society Press 1993; 289-94.
5. **Fackler JC**, Haimowitz I, Kohane I. Knowledge-based data display using TrenDx. Artif Intell Med, Palo Alto, CA 1994; 37-41.
6. **Fackler JC**, Kohane I. Monitor-driven data visualization: SmartDisplay. J Am Med Informatics Assn Proceedings of the 18th annual Symposium on Computer Applications in Medical Care 1994; 939-43.
7. Fauza DO, DiFiore JW, Hines MH, **Fackler JC**, Slavin R, Hirschl R, Wilson JM. Continuous intrapulmonary distention with perfluorocarbon accelerates postnatal lung growth: possible application for congenital diaphragmatic hernia. Surg Forum 1995;46:666-9.
8. Wang K, Kohane I, Bradshaw K, **Fackler J**. The role of knowledge bases in patient monitoring. Artif Intell Med, Palo Alto, CA 1996.
9. Kohane IS, van Wingerde FJ, **Fackler J**, Cimino C, Kilbreidge P, Murphy S, Chueh H, Rind D, Safran C, Barnett O, Szolovits P. Sharing electronic medical records across multiple heterogeneous and competing institutions. Proceedings of the 1996 AMIA symposium 1996; 608-12.
10. Wang K, Kohane I, Bradshaw KL, **Fackler J**. A real time patient monitoring system on the World Wide Web. Proceedings of the 1996 AMIA symposium 1996; 729-32.
11. **Fackler J**. Telecommunications and intensive care medicine: Expectations and limitations. J für Anästhesie und Intensivebehandlung. 1997; S25-7.
12. **Fackler J**, Tsien C, Beaty W, Zimmerman SM. Experimental design: One observation out-of-specification limits system versus SPC methods for patient vital sign management. International Conference on Industry, Engineering, and Management Systems, Coco Beach, FL, 1997.
13. Tsien CL, **Fackler JC**. An annotated data collection system to support intelligent analysis of intensive care unit data. Second International Conference on Intelligent Data Analysis. In: Liu X, Cohen P, Berthold M (eds) Lecture Notes in Computer Science, New York: Springer 1997.
14. Ringer S. **Fackler J**, Icenogle M, Zimmerman S. Clinical alarms versus statistical quality control. International Conference on Industry, Engineering, and Management Systems. Coco Beach, FL, 1999.

15. North MJ, Bell H, O'Hara S, Sullivan M, **Fackler J**. The need for healthcare modeling in virtual worlds. IEEE Virtual Reality, Reno NV, 2008.
16. Ordóñez P, desJardins M, Feltes C, Lehmann CU, **Fackler J**. Visualizing multivariate time series data to detect specific medical conditions. AMIA Annual Symposium, Washington, DC, 2008; 530-4.
17. Wu F, Williams M, Kazanzides P, Brady K, **Fackler J**. A modular clinical decision support system clinical prototype extensible into multiple clinical settings. Pervasive Health, London, UK, 2009.
18. Ordóñez P, desJardins M, Lombardi M, Lehmann CU, **Fackler J**. An animated multivariate visualization for physiological and clinical data in the ICU. International Health Informatics, Washington, DC, 2010.
19. Ordóñez P, Armstrong T, Oates T, **Fackler J**. Using modified multivariate bag-of-words models to classify physiological data. 2011 IEEE 11th International Conference on Data Mining Workshops, Vancouver, BC, 2011, 534-539.
20. Ordóñez P, Armstrong T, Oates T, **Fackler J**. Classification of patients using novel multivariate time series representations of physiological data. 2011 10th International Conference on Machine Learning and Applications and Workshops, Honolulu, HI 2011, 172-179.
21. **Fackler J**, Spaeder M. Why doesn't healthcare embrace simulation and modeling? What would it take? Proceedings of the 2011 Winter Simulation Conference. Phoenix, AZ, 2011.
22. Lea C, **Fackler J**, Hager G, Taylor R. Towards automated activity recognition in an intensive care unit. Third Workshop on Modeling and Monitoring of Computer Assisted Interventions. Nice, France, 2012.
23. **Fackler J**, Hankin J, Young T. Why healthcare professionals are slow to adopt modeling and simulation. Proceedings of the 2012 Winter Simulation Conference. Berlin, Germany, 2012.
24. Lea C, **Fackler J**, Hager G, Taylor R, Saria S. 3D Sensing algorithms towards building an intelligent intensive care unit. AMIA Jt Summits Transl Sci Proc 2013:136–40.
25. Durojaiye AB, McGerorge N, Kristen W, Oruc C, **Fackler JC**, Gurses AP. Characterizing the utilization of the problem list for pediatric trauma care. AMIA Annu Symp Proc. 2018:404-12.
26. Gray G, Lonsdale H, Yates H, Ahumada L, Rehman M, Varughese A, **Fackler J**, Habre W, Disma N. Applying machine learning to identify pediatric patients at risk of critical perioperative adverse events: using the APRICOT dataset. 2021 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC).

Editorials [ED]
1. Truog RD, **Fackler JC**. Do the right thing: Pain relief in children. N Engl J Med 1992;327:125.
2. Spear RM, **Fackler JC**. ECMO and pediatric ARDS: We can afford it, but we don't need it. Crit Care Med 1998;26:1486-7.
3. Heulitt MJ, **Fackler J**. Mortality for pediatric acute respiratory distress syndrome (ARDS) in 1998: Has it changed? Respir Care 1998;43:940-1.
4. **Fackler JC**, Arnold JH. Inhaled nitric oxide, when knowing is not understanding. Crit Care Med 1999;27:2598-9.
5. **Fackler J**. Acute respiratory distress syndrome. New Horizons 1999; 999.
6. **Fackler JC**, Wetzel RC. Critical care for rare diseases. Pediatric Crit Care Med 2002;2:89-90.
7. Hunt EA, Schwartz JM, **Fackler JC**. Surfactant and pediatric acute lung injury. JAMA 2005;8:898-9.
8. **Fackler JC**. Fluid management during respiratory failure: "whatever?". Pediatr Crit Care Med 2005;6:713-4.
9. **Fackler J**, Goldstein B. Pediatric brain death. Crit Care Med 2011;39:2197-8.
10. **Fackler J**. Incubator noise: Don't throw out the baby with the bathwater. Pediatr Crit Care Med 2012;13(6):699-700.
11. **Fackler J**. Stop the noise and get to the point. Crit Care Med. 2013;41(2):656.
12. **Fackler J**, Lehmann H, Wetzel R. Critical care for rare diseases (and procedures): redux. Pediatr Crit Care Med 2015;16(3):297-9
13. **Fackler JC**. The syndrome has been a good friend; now say goodbye – quickly. Pediatr Crit Care Med 2017;18(1):83-5.
14. **Fackler JC**. If you give a mouse a cookie, there will be requests for more and more. Pediatr Crit Care Med 2018 19(2);163-5.

15.   Wiens J, **Fackler JC**. Aiming for the right target and striking the right balance - applying machine learning to pediatric critical care data. Pediatr Crit Care Med 2018;19(7);672-3.
16.   **Fackler J**, Ahumada L. Keys, the streetlamp, and tidbits. Crit Care Med 2018;46(12):2062-3.
17.   **Fackler JC**, Rehman M, Winslow RL. Please welcome the new team member: the algorithm. Pediatr Crit Care Med 2019;20(12):1200-1.
18.   Bergmann J, **Fackler J.** Put the shovel down. Pediatr Crit Care Med. 2020;21(4):397-8.
19.   Surma V, Kudchadkar S, Bembea M, **Fackler J**. The Critical Care Learning Healthcare System: Time to walk the walk. Crit Care Med. 2020;48(12):1907-9.
20.   O'Brian CE, Noguchi A, **Fackler J**. Machine learning to support organ donation after cardiac death: Is the time now? Pediatr Crit Care Med. 2021;22(2):219-220.
21.   Shpister I, Kudchadkar S, **Fackler J**. Causal Inference from Observational Data: It Is Complicated. Pediatr Crit Care Med. 2021;22(12):1093-6.
22.   LaRosa J, Xie A, Fackler J. Latent Safety Threats in the Pediatric Intensive Care Unit: finding the unseen. Pediatr Crit Care Med. 2022 Mar 1;23(3):216-218.

Letters, Correspondence [LT]
1.   **Fackler JC**, Flannery K, Zipkin M, McIntosh K. Precautions in the use of ribavirin at The Children's Hospital. N Engl J Med 1990;322:634.
2.   Goodman DM, Winkler MK, Fiser RT, Abd-Allah S, Mathur M, Rivero N, Weiss IK, Peterson B, Cornfield DN, Mink R, Nozik Grayck E, McCabe ME, Schuette J, Nares MA, Totapally B, Petrillo-Albarano T, Wolfson RK, Moreland JG, Potter KE, **Fackler J**, Garber N, Burns JP, Shanley TP, Lieh-Lai MW, Steiner M, Tieves KS, Goldsmith M, Asuncion A, Ross SL, Howell JD, Biagas K, Ognibene K, Joshi P, Rubenstein JS, Kocis KC, Cheifetz IM, Turner DA, Doughty L, Hall MW, Mason K, Penfil S, Morrison W, Hoehn KS, Watson RS, Garcia RL, Storgion SA, Fleming GM, Castillo L, Tcharmtchi MH, Taylor RP, Ul Haque I, Crain N, Baden HP, Lee KJ. The Accreditation Council for Graduate Medical Education proposed work hour regulations. Pediatr Crit Care Med 2011;12:120-1.
3.   Cifra CL, Jones KL, Bhalala US, Bembea MM, Newman-Toker DE, **Fackler JC**, Miller MR. Morbidity and mortality conferences in pediatric critical care: The authors reply. Pediatr Crit Care Med 2015;16(9):896-7.
4.   Schwartz JM, Kudchadkar SR, McCloskey JJ, Berkowitz ID, **Fackler J**, Goswami D, Wadia R, Barnes, SS, Shaffner, DH. The pediatric critical care anesthesiologist: extinction is not an option. Anesth Analg 2019;129(2):e62-e63.

FUNDING

EXTRAMURAL Funding

Research Extramural Funding – Current

8/1/21–9/26/22   Project Firstline
                        CDC
                        Subcontract from the APL
                        PI: Ayse Gurses
                        Role: Subject matter expert, 10%

7/1/22-6/30/27   EHR usability and usefulness, perceived missing nursing care and medication errors in critical care
                        AHRQ, JHU sub
                        PI: Trinkoff (University of Maryland)
                        Role: Subject matter expert, 5%

Research Extramural Funding – Pending:

9/1/22–9/30/23   Point-of-care flow cytometry in sepsis
                        Sponsored Research: Ativa Medical
                        $453,000
                        PI: William Clarke
                        Role: Co-Investigator, 10%

Research Extramural Funding - Previous

1991–1992   Brain Energetics in a Newborn Piglet Model of Cardiopulmonary Bypass
                       Foundation for Anesthesia Education and Research
                       $50,000
                       Role: PI

1993–1996   Creation of a Neonatal Extracorporeal Membrane Oxygenation Workstation, 'Smart Alarms', and
                       'Smart Displays'
                       SpaceLabs Medical
                       $110,000
                       Role: PI

1994–1996   Display Software to Explore Time-oriented Clinical Data
                       NICHD-SBIR
                       $150,000
                       PI: David Fram
                       Role: Consultant

1994–1997   Pediatric Acute Respiratory Distress Syndrome: A Randomized Clinical Trial of Extracorporeal
                       Membrane Oxygenation (ECMO) with Non-ECMO Modalities.
                       Ronald McDonald Foundation
                       $450,000
                       Role: PI

1998–1999   Use of Ultrasound Guided Catheters for Vascular Access in Children
                       Escolon Corporation
                       $10,000
                       Role: PI

1999–2000   Reduction of Intravenous Potassium Use in the PICU
                       MCIC
                       $50,000
                       Role: PI

2012–2014   Advancing and Optimizing Quality of Resuscitation in Children with Cardiac Arrest
                       Hartwell Foundation
                       $250,000
                       PI: Elizabeth Hunt, MD
                       Role: Co-Investigator, 3% effort

2014–2015   Pediatric Critical Care Predictive Analytics: Extension of an Adult Acuity Algorithm to Children
                       OBS Medical
                       $136,000
                       Role: PI, 5% effort

2014–2015   Automated Ventilator Decision Support

VPICU fellowship
$70,000
Role: PI, 10% effort

1994–1997   Multiplatform Internet Access to Multimedia EMRS
NIH-NLM (U01)
$8,000
PI: Isaac Kohane
Role: Consultant

1995–1997   Voyager Project--Infrastructure for the Electronic Medical Record
NIST-ATP
$225,000
PI: David Fram
Role: Consultant

1997–1999   Health Information Identification and De-identification Toolkit
NLM (R01)
$299,716
PI: Isaac Kohane
Role: Consultant

1999–2000   Innovative Knowledge Management
Medbiquitous Laboratory
$50,000
Role: PI

2002–2003   Multi-institutional, High Granularity Data Integration
Virtual Pediatric Intensive Care Unit
$50,000
Role: PI

2009–2011   Forecasting Demand for Pediatric Critical Care
National Science Foundation
$319,335
PI: Scott Levin
Role: Investigator

2012   Agent-based Modeling
NIH Institute on Systems Science and Health, Office of Behavioral and Social Sciences Research
Training and Travel Grant
$2,500
Role: PI

2013   Pediatric Surge Capacity
Department of Homeland Security
Total direct costs:
PI: Gabor Kelen
Role: Co-Investigator, 10% effort

7/1/15-4/30/21   Teamwork and Care Transitions in Pediatric Trauma: Implications for HIT Design
AHRQ
$366,387

PI: Ayse Gurses
Role: Co-Investigator, 7.5%

10/01/17-9/30/21   Implementing Diagnostic Stewardship to Reduce Antibiotic Use and Resistance in
                         Critically Ill Children
                         R18 HS 25642 – 01
                         AHRQ
                         $404,883
                         PI: AM Milstone
                         Role: Co-investigator, 10%

9/01/20-8/30/21   Sepsis Early Goal Directed Therapy (EGDT) using Digital Twin Models
                         JHU-APL. IRAD
                         $75,300
                         PI: Michael McShea
                         Role: Co-Investigator, 2.5%

Educational Extramural Funding: None

Clinical Extramural Funding: None

System Innovation or Quality Improvement Extramural Funding – Current: None

System Innovation or Quality Improvement Extramural Funding – Pending: None

System Innovation or Quality Improvement Extramural Funding – Previous

2017-2019   Development of a Clinical Decision Support Tool for Facilitating Naturalistic Decision-Making
                and Improving Blood Culture Utilization
                1R21HS025238
                AHRQ
                $154,387
                PI: Anping Xie
                Role: Collaborator, 5%

1999–2000   Reduction of Intravenous Potassium Use in the PICU
                MCIC
                $50,000
                Role: PI

2015-2016   Reducing Blood Culture Utilization in the PICU – Integrating Data and Metadata with
                Implementation Science
                MITRE Corporation
                $261,818
                Role: Co-Principal Investigator, 10% effort

2016-2018   T4: Trigger, Think, Track and Treat Sepsis– Moving Beyond Clinical Decision Support
                Contract No. 115714
                MITRE Corporation
                $318,892
                PI: AM Milstone
                Role: Co-Principal Investigator, 10%

Other Extramural Funding: None

INTRAMURAL Funding

Research Intramural Funding: None

Educational Intramural Funding: None

Clinical Intramural Funding – Current: None

Clinical Intramural Funding - Pending: None

Clinical Intramural Funding – Previous
2007–2008   Children's Center Throughput Improvement
                          Departments of Pediatrics, Anesthesiology, Surgery, and Administration, Johns Hopkins
                          $80,000
                          Role: PI

7/1/18-6/30/19   Development, Implementation, and Evaluation of a Comprehensive Ventilator-
                          Associated Adverse Event Application in the Pediatric Intensive Care Unit
                          StAAR Award, Department of Anesthesiology and Critical Care Medicine
                          $58,000
                          Role: PI

System Innovation or Quality Improvement Intramural Funding: None

Other Intramural Funding: None

CLINICAL ACTIVITIES

Clinical Focus
        Pediatric Critical Care Medicine
        Pediatric Anesthesiology

Certifications

Medical, other state/government licensure
1980–1988   Maryland License #D29145
1988–1998   Massachusetts License Registration #59247
1996–present Maryland License (reactivation) #D29145

Boards, other specialty certifications
1986   Diplomat, American Board of Pediatrics, Certification #33285
1991   Diplomat, American Board of Anesthesiology, Certification #20110
1992   Diplomat, American Board of Pediatrics, Sub-Board of Critical Care Medicine, Certification
              #366
2007-2023   Recertified, American Board of Pediatrics, Sub-Board of Critical Care Medicine

Clinical (Service) Responsibilities
1996-present Attending Physician, Pediatric critical care (12 weeks per year)
1996-present Attending Physician, Pediatric anesthesiology (1 day per week)

Clinical Productivity
I have, depending on the amount of research funding, continuously performed patient care in the Pediatric Intensive Care Unit or the Pediatric Operating Rooms 2 to 3.5 days per week. Even while on sabbatical at Cerner, I remained active clinically at 2 days per week.

Clinical Draw
Given the nature of Pediatric Anesthesiology and Critical Care Medicine, I do not personally draw patients. It is worth noting, I am occasionally specifically requested as an anesthesiologist for children of colleagues.

Membership in or examiner for specialty board: None

Clinical Program Building / Leadership
I have distinguished myself as both a thought leader on the most challenging clinical problems of the time and as a leader of clinical programs that deal with cutting-edge challenges.

I have dedicated my career to understanding how to define and recognize disease patterns. With knowledge of these patterns, treatment protocols can be applied consistently to improve the quality of care delivered to critically ill children. I have made a concerted effort throughout my career to identify the problems at the forefront of the current science and analyze them with a unique approach by bringing together *multidisciplinary* teams and profoundly influencing the course of pediatric critical care. I am an internationally recognized expert in pediatric critical care informatics and the emerging field of artificial intelligence in medicine.

Early in my career, I was appointed to Director of the Multidisciplinary Intensive Care Unit at the Children's Hospital Boston. This position focused my attention on the high-resource, high-risk pioneering therapy of extracorporeal membrane oxygenation (ECMO). In that role I also led the pediatric critical care medicine fellowship, respiratory therapy, and ECMO programs. During this time, I quickly expanded my influence with a national leadership position in the Extracorporeal Life Support Organization (ELSO) and chaired the Protocols Committee. In that national role, I participated in the growth of ECMO use and the recognition of its extraordinary lifesaving support of children with primary pulmonary hypertension (PPHN) of the newborn.

Given the absence of data in the mid-1990s to support ECMO use outside of neonates with PPHN, I organized a multi-institutional data analysis to support mortality prediction (see OR 18) and then launched a foundation-funded 10-site randomized clinical trial of ECMO for respiratory failure in children. The data were presented in abstract form and the multi-institutional experiences definitely changed the course of ECMO use in children with acute respiratory distress syndrome (ARDS) on a national level (see Selected Abstracts 7-9). I remained active in ELSO and published two original research articles, two chapters, and an editorial in the field of ECMO. I led three national courses focused on ECMO and gave five abstract presentations at national meetings (including one in 2019).

Yet it was systems innovation designed to improve health care quality coupled with health information technologies that eventually became my core focus. While still at Boston Children's Hospital with Dr. Isaac Kohane, I cofounded the Children's Hospital Informatics Program (now called the Computational Health Informatics Program http://www.chip.org/). A number of international informatics experts have launched their careers from CHIP (e.g., Ken Mandl, Dan Nigrin, Atul Butte) and its enduring nature is evidenced by the 25th anniversary celebration held in September 2019.

I hold key roles, including leadership roles, in several programs within The Johns Hopkins Hospital and the School of Medicine as well as several well-recognized national programs. I am actively sought out to lead important initiatives not only because of my well-recognized subject expertise but also for my leadership skills and ability to collaborate across a myriad of disciplines, both clinical and technical. Highlights of my recent accomplishments are summarized below.

I was the Pediatric Critical Care Fellowship Director from 2009 to 2015. Under my leadership, the program received full accreditation by the ACGME. In addition to those I personally mentored (whose work is highlighted elsewhere in this document) a number of the 41 fellows are now in prominent leadership and academic positions.

In 2012, within the pediatric intensive care unit (PICU) at the Johns Hopkins Hospital, I conceived, led the culture change, and created the position of Director, Safety-Quality-Logistics and created an interdisciplinary working group known as the Safety, Quality, and Logistics (SQL) working group within the PICU. I expanded the SQL leadership to include a representative of Respiratory Therapy as well as the PICU Nurse Manager. Operationally, the SQL working group continues to meet weekly (and has for 7 years). A formal CUSP (or Comprehensive Unit Safety Program) program to reach a broader audience within the entire PICU community was launched in the last year. Under my leadership, the SQP has tackled many important issues and improved the quality of care provided to patients in the PICU, including addressing the significant issue of PICU "burn-out" in PICU health care providers. I recently transitioned the leadership of SQL to a colleague. SQL remains robust and continues to serve as an institutional model for safety-quality teamwork. The transition also allows me to focus on the BASE (Bedside Assistance for Safety with extra Eyes; see below).

In 2014, after witnessing the impact of a late cancellation of a surgical procedure on the child, the family, and the health care providers, I identified the need for a Pediatric Access Coordinator and obtained funding for the position. Based on my well-recognized clinical expertise and collaborative style, I was asked to assume this position, and I continue in this role. As the Pediatric Access Coordinator, I am responsible for optimizing the operating room-to-PICU interface so that children's surgeries are delayed as infrequently as is possible. Under my leadership, the process for the operating room scheduling of surgical cases requiring PICU beds has been refined to incorporate PICU bed availability. The position has been continuously funded by the Departments of Pediatrics, Surgery, and Anesthesiology. Most importantly, the quality of the care provided to the children has improved, as no cases in the last two years have required late cancellation for lack of an ICU bed.

In 2016, I led the PICU's initiative to launch a tele-monitoring project for all 40 beds in the PICU. Called the BASE (Bedside Assistance for Safety with extra Eyes), we are utilizing cameras in each room that enable a senior nurse in the BASE to support junior nursing. Begun in part to improve the nursing work environment (and decrease nursing turnover) the senior BASE nurses assist the bedside nurses with clinical questions, medication double checks, crisis documentation and "just" monitoring of the children when the bedside nurse is concerned and with another child. The "extra pair of eyes" is an essential component to augment patient safety given both the introduction of single-patient rooms in the PICU and a decline in the experience level of bedside PICU nurses. Under my guidance, the project team is now in the process of adding a vital sign monitoring solution that will allow implementation of anomaly detection algorithms (well beyond the simple threshold alarms supplied by the physiological monitoring company). The BASE has been staffed for 60 hours per week for the last 12 months and will move to 24x7 coverage in the next quarter.

Clinical Demonstration Activities:
In my early career, while on faulty at Harvard, I lectured and led national research efforts on mechanical ventilation, ECMO, perflubron use, and nitric oxide use for respiratory failure in children.   After returning to Hopkins, I continued to promote ECMO use in children and organized and led a regional ECMO conference.

Most recently (and discussed at more length elsewhere in this CV) I launched a diagnostic stewardship program focused on blood culture use in the PICU and mentored a PICU fellow to publish our early experience. In ongoing work, the program has expanded nationally.

Development of Nationally/Internationally Recognized Clinical Standard of Care
My first publications highlighted the inconsistency between the conceptual and operations definitions of brain death. As a PICU fellow at Johns Hopkins, I wrote the first analysis of the (at the time) emerging concept of brain death in children. An initial case report was followed with a more comprehensive analysis of the neuro-clinical characteristics of brain death in children, which showed substantial dissidence between the definitions of brain death. After taking my first faculty position at Harvard, my colleagues and I wrote three additional original research manuscripts (OR 6, 7, and 8). I was recognized for my original critical thinking about this issue, spoke nationally about this topic, and wrote five opinion pieces. Notably, I was chosen to write the editorial in 2011 in *Critical Care Medicine* in response to publication of the most recent updated pediatric brain death guidelines.

Also, early in my career in Boston, I recognized the importance of artificial intelligence (AI) and big data. Indeed, two of my longest continuous affiliations with professional societies have been with the American Medical

Informatics Association (1992) and the Association for the Advancement of Artificial Intelligence (1994), exceeded only by membership in the Society for Critical Care Medicine (1985). In both AMIA and SCCM I have held leadership positions in critical care and informatics. My national leadership in AI is evidenced by my invitation and active participation on the National Academy of Medicine's Digital Learning Collaborative.

During my leadership of the SQL, we established a multidisciplinary team that researched factors that contribute to central line-associated blood stream injections (CLABSI) and initiated a multipronged effort to reduce their occurrence. Although many efforts contributed to the reduction, a theme from the root cause analyses of each infection showed that many "infections" were actually associated with false-positive blood cultures. This realization led to the creation of an algorithm for the effective use of blood cultures. This work was presented internally at the inaugural Hopkins High-Value symposium (as they showed a $60,000 per year savings with sustained patient care quality). The work has also been presented at national meetings [Selected Abstracts 23,24] and published in *JAMA Pediatrics* [OR 51]. Ongoing work is supported by federal funding and has been disseminated [OR 55 and 57]. Data from the PICU through June 2020 show that the decrease in blood culture utilization has persisted.

The CLABSI work led directly to a multi-institutional AHRQ-funded collaboration. This BrightStar collaborative met recently to codify national guidelines for blood culture use in pediatric critical care. The manuscript for the guidelines is in preparation, and discussions are ongoing with relevant professional societies for their endorsement before publication. Member children's hospitals in the BrightStar collaborative are:
> Johns Hopkins All Children's Hospital,
> Cleveland Clinic Children's Hospital,
> Dell Children's Medical Center,
> Doernbecher Children's Hospital,
> Le Bonheur Children's Hospital,
> Lurie Children's Hospital of Chicago,
> Primary Children's Hospital,
> Rainbow Babies and Children's,
> Seattle Children's Hospital,
> St. Louis Children's Hospital,
> St. Jude's Children's Hospital,
> Stanford Children's Health Lucile Packard Children's Hospital,
> Boston Children's Hospital,
> Monroe Carell Jr. Children's Hospital at Vanderbilt Children's Hospital and Medical Center, and
> Omaha Children's Healthcare of Atlanta.

EDUCATIONAL ACTIVITIES

Educational Focus
My educational focus is two-pronged: 1) teaching clinical pediatric critical care and health informatics to fellows and housestaff, and 2) mentoring computer science and biomedical engineering undergraduate and graduate students in relevant healthcare issues.

In the current academic year, I am mentoring three groups of undergraduate students in the Biomedical Engineering EN580.850 (Precision Medicine) course led by Dr. Rai Winslow. I am also mentoring a team within EN.520.25 (Leading Innovation Design Team) led by Dr. Charbel Rizk. Within the Carey Business School, I am also mentoring a group of students in the MS Program's Health Care Strategy and Consulting Practicum course.

Selected Teaching Experience

Classroom instruction
JHMI/Regional

1986–1988	Lecturer, Paramedic Training, Essex Community College, "Transport and Pediatric Airway Problems"
1987	Discussant, Advanced Pediatrics Life Support, New Techniques in Cardiopulmonary Resuscitation, Johns Hopkins University School of Medicine, Baltimore, MD
1990	Medical Grand Rounds, "Brain Death," Children's Hospital, Boston, MA
1991	Lecturer, Anesthesia Review and Update, Harvard University Post-Graduate Course, "Brain Resuscitation," Harvard Medical School, Boston, MA
1991	Lecturer, "Ribavirin" Longwood Respiratory Education Committee, Beth Israel Hospital, Boston, MA
1991	Course Director, Second Annual New England ECMO Symposium, Boston, MA
1992	Lecturer, Practical Aspects of Pediatric Anesthesia, "Extracorporeal Membrane Oxygenation," Massachusetts General Hospital, Boston, MA
1992	Pediatric Grand Rounds, "Extracorporeal Membrane Oxygenation," New England Medical Center, Boston, MA
1992	Course Director, Third Annual New England ECMO Symposium, Boston, MA
1992	Lecturer, Intensive Review of Neurology, Harvard University, Post-Graduate course, "Cerebral Resuscitation," Harvard Medical School, Boston, MA
1992	Medical Grand Rounds, "Extracorporeal Membrane Oxygenation," Children's Hospital, Boston, MA
1993	Course Director, Fourth Annual New England ECMO Symposium
1993	Surgical Grand Rounds, "ARDS; State of Frustration" Children's Hospital, Boston, MA
1993	Anesthesia Grand Rounds, "ECMO" Children's Hospital, Boston, MA
1994	Lecturer, Practical Aspects of Pediatric Anesthesia, "Congenital Diaphragmatic Hernia," Massachusetts General Hospital and Children's Hospital, Boston, MA
1995	Medicine Grand Rounds, ARDS: Novel Therapies, Deaconess Hospital, Boston, MA
1995	Pediatric Anesthesia/Surgery Grand Rounds; ARDS: Novel Therapies; Massachusetts General Hospital, Boston, MA
1996	Anesthesiology and Critical Care Medicine Grand Rounds; Critical Care Informatics, The Johns Hopkins Hospital, Baltimore, MD
1999	Anesthesiology Grand Rounds, ARDS: ECMO and Beyond, Johns Hopkins University, School of Medicine, Baltimore, MD
1999	Medicine Conjoint Clinic, Inhaled nitric oxide; not a laughing matter, Johns Hopkins University, School of Medicine, Baltimore, MD
1999	Pediatric ECMO, American College of Chest Physicians, Chicago, IL
2013	Faculty, Clinical Informatics, Johns Hopkins University School of Medicine.
2017	Seminar Lead. Better medicine in the PICU means more sick kids. Carey Business School, Baltimore, MD
2018	Faculty Mentor, Leading Innovation Design Team (LINDT). Whiting School of Engineering, Baltimore, MD
2019	Faculty Mentor, EN.580.481.01.SP20 Precision Care Medicine II. Whiting School of Engineering, Baltimore, MD (2-teams)
2019	Faculty Mentor, Biomedical Design Team. Whiting School of Engineering, Baltimore, MD.
2020	Faculty Mentor, Health Care Strategy and Consulting Practicum, Carey Business School, Baltimore, MD
2020	Lecturer, Clinical Decision Support, Johns Hopkins University Biomedical Informatics Program, Baltimore, MD
2020	Faculty Mentor, EN.580.481.01.SP20 Precision Care Medicine II. Whiting School of Engineering, Baltimore, MD (2-teams)

National

1992	Pediatric Grand Rounds, "Extracorporeal Membrane Oxygenation," Hartford Hospital, Hartford, CT
1992	Pediatric Grand Rounds, "Cerebral Resuscitation," Medical Center of Vermont, Burlington, VT

International: none

Clinical Instruction
JHMI/Regional

1983–1987	Preceptor, Medical Students, Department of Pediatrics, Johns Hopkins University School of Medicine, Baltimore, MD
1987–1988	Pediatric ICU Attending Physician, Department of Pediatrics, University of Maryland, Baltimore, MD
1987–1988	Anesthesia Attending Physician, Department of Anesthesia, University of Maryland, Baltimore, MD
1988–1996	Supervision and teaching of fellows, residents, medical and dental students, Department of Anesthesia, Children's Hospital, Boston Multidisciplinary Intensive Care Unit

National: none

International: none

CME instruction

Workshops/seminars

Mentoring

Pre-doctoral Advisees/Mentees

1993	Alton Liu: Master's Thesis Advisor, Boston University, "Extracorporeal Membrane Oxygenation Workstation." Co-inventor on Patent 1; Co-authored Selected Abstract 5.
1996-1997	Martha Curley: Thesis Committee, Boston College, Boston, MA. Currently Ellen and Robert Kapito Professor in Nursing Science, University of Pennsylvania School of Nursing. Co-authored Selected Abstract 15 and articles OR 25, 30.
2000-2005	Jeanette White: Chair, Thesis Committee, Johns Hopkins University, Baltimore, MD. Currently Private Practice, Washington, DC. Co-authored article OR 29
2008-2012	Patricia Ordóñez: Thesis Committee, University of Maryland, Baltimore County. Currently Assistant Professor, University of Puerto Rico Río Piedras, Department of Computer Science. Co-authored Selected Abstracts 19, 20 and articles OR 40 and PR 16, 18-20.
2009	Fran Wu: Master's Thesis Advisor, Johns Hopkins University "A Modular Framework for Clinical Decision Support Systems: Medical Device Plug-and-Play is critical". Co-authored article PR 17.
2018	Sanjukta Nandi Bose: PhD Oral Examiner, Johns Hopkins University.
2018	Ying Ling Yin: Thesis Committee External Reviewer, Univ of Toronto, ON, CA. "Technology-Mediated Data, Its Integration and Its Impact on Intensive Care Cognitive Work".
2019	Ran Liu: PhD Oral Examiner, Johns Hopkins University. Co-authored articles OR 60, 69.

Post-doctoral Advisees/Mentees

I was the Pediatric Critical Care Fellowship Director from 2009 to 2015. Under my leadership, the program received full accreditation by the ACGME. In addition to those I personally mentored (whose work is highlighted elsewhere) a number of the 41 Fellows are now in prominent leadership and academic positions.

2008-2010	Michael Spaeder, MD. As a direct outgrowth of my interest in leveraging data (long before the phrases "big data" and "artificial intelligence" became popular, I helped Dr. Spaeder leverage his math and critical care expertise to launch a successful academic career. During Michael Spaeder's

PICU fellowship, he developed a novel predictive analytic that accurately predicts the onset and severity of the pediatric viral season based on the previous year's data. (Novel application of Autoregressive Integrated Moving Average (ARIMA) models to predict morbidity and mortality outcomes in pediatric viral respiratory disease.) Co-authored articles OR 34-38; RA7; PR19). His research has flourished and remains focused on the use of physiologic monitoring data to identify patients at risk for clinical deterioration. Dr. Spaeder is currently an Associate Professor in Pediatric Critical Care at the University of Virginia's Children's Hospital and is the Director of the Critical Care Fellowship.

2008-2010   Jason Custer, MD. I fostered Jason Custer's interest in the cognitive burden associated with providing critical care and guided his evaluation of the information processing between junior and senior clinicians. (Defining team-based cognitive workflow in pediatric intensive care using cognitive task analysis) Co-authored articles OR 39, 41; RA7; BC7). Under my mentorship, Dr. Custer, as a PICU fellow, developed an interest in expert and team cognition in complex patients with a focus on medical communication and data utilization. Dr. Custer is currently an Associate Professor in Pediatrics at the University of Maryland and recently transitioned from being the Medical Director of the PICU to Director of Safety and Quality for the University of Maryland Hospital.

2011-2014   Christina Cifra, MD. As a PICU fellow, Dr. Cifra was interested in exploring lessons to be learned from the PICU morbidity and mortality conferences. I mentored her in her research on diagnostic errors in a PICU. Co-authored articles OR 42, 43, 47, 50; LT3). Dr. Cifra continues this work and is funded on the University of Iowa Department of Pediatrics K12 Child Health Research Career Development Award (CHRCDA). She is currently a Clinical Associate Professor of Pediatrics – Critical Care at the University of Iowa Health Care.

2013-2016   Charlotte Woods-Hill, MD. My work to reduce the occurrence of CLABSI sparked the interest of Charlotte Woods-Hill, and as a PICU fellow she worked on the development of an algorithm for appropriate use of blood cultures (Reducing unnecessary blood culture use in critically ill children). Co-authored articles OR 51, 55, 57, 59, 63 67 and Selected Abstracts 22-25, 28, 29, 33, 35). Dr. Woods-Hill continues this work at the Children's Hospital of Philadelphia where she is an Assistant Professor in Pediatrics. I continue to mentor Dr. Woods-Hill, and we are co-investigators on an AHRQ grant that is funding dissemination of the blood culture algorithm work to 15 other pediatric intensive care units. Dr. Woods-Hill received her K-award application in 2020.

The list below contains the names of fellows recruited while I was the Fellowship Director. Of the 37, 35 remain active in Pediatric Anesthesiology and/or Critical Care Medicine. Eleven remain at Hopkins (with 2 at the Associate Professor level). Two are at the Mayo Clinic, three at Stanford, two at Children's Hospital of Philadelphia, and one at Boston Children's Hospital. Five have institutional leadership roles.

Melissa Sacco, MD
Corina Noje, MD
Dheeraj Goswami, MD
Justin Lockman, MD
Michael Nemergut, MD
Sapna Kudchadkar, MD
Rajeev Wadia, MD
Mary Demian Saleh, MD
Elizabeth Charnovich, MD
Katherine Steffen, MD
Aisha Frazier, MD

Christina L. Cifra, MD
Devon Aganga, MD
Chinyere Egbuta, MD
Kareen Jones, MD
Melissa Fussell, MD
Melanie Cooper, MD
Kristen Smith, MD
Jennifer Criscola, MD
Elizabeth Tucker, MD
Andrew Corcoran, MD
Julia Noether, MD
Meghan Bernier, MD
Bereketeab Haileselassie, MD
Shilpa Narayan, MD
Lindsey Rasmussen, MD
Miriam Shapiro, MD
Charlotte Woods-Hill, MD
Caitlin O'Brien, MD
Jennifer Kramer, MD
Nicholas Morin, MD
Renee Willett, MD
Katherine Hoops, MD
Sean Barnes, MD
Katharine Boyle, MD
Elizabeth Herrup, MD
Amy Manzo, MD

After stepping down from my role as Fellowship Director, I continued to mentor fellows. Two of particular note are:

2016-2019   Anna Sick-Samuels, MD, MPH. I began mentoring Anna Sick-Samuels when she was a Pediatric Infectious Disease fellow, exemplifying my work as an interdisciplinary collaborator. I mentored Dr. Sick-Samuels in her work to evaluate the use of endotracheal tube aspirate culture for diagnosis and treatment of ventilator-associated pneumonias. This mentoring relationship continues, as Dr. Sick-Samuels remains at Johns Hopkins as an Instructor in Pediatrics. Dr. Sick-Samuels has just recently resubmit her K-award proposal. Co-authored articles OR 53, 59, 64, 71.

2017-2021   Jules Bergmann, MD. My work to reduce the occurrence of CLABSI also sparked the interest of Jules Bergmann. Under my mentorship, he began to evaluate the use of endotracheal tube aspirate culture for the diagnosis and treatment of ventilator-associated pneumonias. Similar to blood cultures, preliminary evidence suggests that endotracheal tube cultures may be over-utilized and result in unnecessary antibiotic use. I continue to mentor Dr. Bergmann, who, now done with his T32 training remains at John Hopkins as a Data Scientist within the Department of Anesthesiology and Critical Care Medicine. Co-authored articles OR 72, 75, 78, 29, ED 18, and Selected Abstracts 31, 37, 38.

Outside of Hopkins, I am on the mentor committee for KL2 work at the University of Maryland Baltimore county for:

2020-present   Mathangi Gopalakrishnan, PhD. The goal of Dr. Gopalakrishnan's research is to evaluate the ability of vital sign dynamics (VSD) to predict the need for red blood cell transfusion during initial resuscitation in a population of severely injured trauma patients.

Educational Program Building/Leadership
Not applicable

Educational Demonstration Activities to an External Audience
Not applicable

RESEARCH ACTIVITIES

Research Focus
I am dedicated to understanding how to define and recognize disease patterns. Once the patterns are recognized, treatment protocols can be consistently applied to improve the quality of care delivered to critically ill children. A consistent theme throughout my career has been my ability to identify problems at the forefront of the current science, analyze them with a unique approach, and bring together *multidisciplinary* teams that can profoundly impact the course and history of pediatric critical care. I have garnered international recognition as an expert in pediatric critical care informatics and in the emerging field of artificial intelligence in medicine.

Research Program Building
I was instrumental in the institutional effort to bring to the Hopkins community the Precision Medicine Analytics Platform (PMAP) data. I leveraged my active membership of IRB-X, and when the PMAP application came to the Board for review, I quite literally rewrote the protocol and engaged the IRB-X Chair, regulatory experts, and legal team to bring the protocol into full compliance with both the Common Rule and the Hopkins Data Trust. With my input, the protocol was quickly approved. Further, working with a PICU fellow mentee and Dr. Adam Sapirstein, I am bringing the conceptual reality of PMAP to full implementation within the Department of Anesthesiology and Critical Care Medicine. As of September 2021, the ACCM-PMAP Registry contains data on about 630,000 patients who had about 800,000 anesthetic procedures and about 21,000,000 inpatient and outpatient encounters. The ACCM-PMAP Registry is supporting the work of 18 investigator teams across all the Divisions of the Department.

Research Demonstration Activities

Inventions, Patents, Copyrights

1998	U.S. Patent No. 5,729,204 for "An intelligent cable for controlling data flow" Assignee: Children's Hospital Boston. – predicate for all modern device integration solutions
2009	U.S. Patent No. 7,519,541 for "System and method in a computer system for managing a number of attachments associated with a patient" Assignee: Cerner Corporation.
2009	U.S. Patent No. 7,612,679 for "Computerized method and system for providing alerts from a multi-patient display" Assignee: Cerner Corporation.
2011	U.S. Patent No. 8,204,771 for "Computerized method and system for updating a task list from an action item documentation view" Assignee: Cerner Corporation.
2012	U.S. Patent No. 8,273,018 for "Computerized method for establishing a communication between a bedside care location and a remote care location" Assignee: Cerner Corporation
2013	U.S. Patent No. 8,473,308 for "System and method for sharing medical information" Assignee: Johns Hopkins University.
2015	Invention Disclosure Notification (JHU Reference C13903) A System for Team Performance Optimization
2016	U.S. Patent No. 9,311,449 for "Hospital Unit Demand Forecasting Tool" Assignee: Johns Hopkins University.
2021	Invention Disclosure Notification (JHU Reference C16929) Therapeutic Process Modeling; a Method for Team Performance Optimization.
2021	Invention Disclosure Notification (JHU Reference C17058) Assured Autonomous Mechanical Ventilation

My first patent (U.S. Patent No, 5,729,2040) was for a device integration cable and serves as a predicate design for devices currently marketed. Although not directly commercialized, the patent was used as a predicate for the commercial device integration solution currently installed in the PICU.

I have been awarded several patents related to process improvement for data collection and data presentation. I was awarded four patents for inventions that optimize data presentation with the EMR. These patents were awarded during my time at Cerner and are currently instantiated in the Cerner EMR solutions. My patent for sharing medical information resulted from my research using computerized order entry data for the real-time prediction of PICU length of stay. This patent is licensed to a Baltimore-based company.

Technology Transfer Activities
2018   I launched a startup to disseminate the 2015 Invention Disclosure of "A System for Team Performance Optimization." The company currently has a prototype program to optimize the care of children with sepsis. Projections are for four sites to be live in 2021 and eight by 2022.

SYSTEM INNOVATION AND QUALITY IMPROVEMENT ACTIVITIES

System Innovation and Quality Improvement efforts within JHM
2012   Within the PICU at Johns Hopkins, I led the culture change and created the position of "Safety-Quality-Logistics." In the first year of work, we delivered to all PICU clinicians and support staff (about 450 individuals) a broadly focused safety culture survey (with a 75% response rate). Based on the results of that survey, we distributed a second survey focused on communication (with a 60% response rate). Problems identified fell into 5 themes: (1) Communication; (2) Sedation; (3) Medication Errors; (4) Staff Turnover; and (5) Infections.

For the communication issues, we implemented solutions that included training a core group for TeamSTEPS, three daily "huddles" for unit synchronization, nurse-driven daily rounds, and a continuity document for all PICU patients. We undertook a complete revamping of our Morbidity and Mortality conferences and published [OR 49] and spread the work in a workshop at Pediatric Academic Societies meeting [2014]. For the sedation issues, others (championed by Dr. Sapna Kudchadkar) launched an effort to lighten sedation and increase mobility in the children in the PICU. "PICU Up" is now an internationally recognized effort. Many efforts on medication errors have been initiated. Foremost, we have a pharmacist at our weekly meetings as well as on rounds. Not for lack of thought and efforts, staff turnover is a problem that we have yet to effectively address.

On the infection issues, central line-associated infections were a significant problem in 2013 and 2014. We initiated a multipronged effort to reduce them. In brief, we brought our rate from above 4 infections per 1000-line days to below 1.5. Although many efforts contributed to the reduction, a theme from the root cause analyses of each infection showed that many "infections" were actually associated with false-positive blood cultures. This realization led to our creation of an algorithm for the effective use of blood cultures. This work was presented internally at the inaugural High-Value symposium (as we showed a $60,000 per year savings). The work has also been presented at national meetings [Selected Abstracts 23, 24], published [OR 51], and in ongoing work, disseminated [OR 55 and 57]. Data from the PICU as of November 2018 shows persistence of the decreased blood culture utilization.

Work on infection issues is ongoing. The most recent effort is focused on the use of endotracheal tube aspirate cultures, working again with the hypothesis that they are overused and thus might result in unnecessary antibiotic use. We have surveyed clinicians [Selected Abstract 25] and created an algorithm similar to the blood culture one described above. Preliminary data are encouraging.

2014   I created the position of Pediatric Access coordinator. This individual is responsible for optimizing the operating room-to-PICU interface so that children's surgeries are delayed as infrequently as is possible. The position remains operational and has been continuously funded by the Departments of Pediatrics, Surgery, and Anesthesiology.

2016   We launched a tele-monitoring project for all 40 beds in the PICU, with both video and senior nursing. Called the BASE (Bedside Assistance for Safety with extra Eyes), the monitoring allows real-time decision support to monitor protocol use and specifically target reductions in ventilator days and decreased nitric oxide use. Implementation began in October 2016, and a qualitative analysis of the BASE has been used for a doctorate of nursing thesis. Even in the pilot phase, the BASE was toured by the NIH as it considered the Hopkins PICU for tele-monitoring and tele-medicine. Funding for 12 x 7 nursing coverage was recently added and as night-vision cameras are added, the BASE will move to 24 x 7 coverage.

System Innovation and Quality Improvement efforts outside of JHM

1995   With Zak Kohane, I co-founded the Children's Hospital Informatics Program (CHIP), Boston MA. The research program continues with more than 20 faculty and 20 staff members working in the broad directions of multidisciplinary applied research and education program at Boston Children's Hospital. CHIP investigators work at the intersection of information science, healthcare, and biomedical discovery to advance the state-of-the-art in functional genomics, personalized medicine, biomedical research collaboration, and public health.

              Since 1995, CHIP researchers have worked to set the highest standards for patient autonomy and privacy. Our "Instrumenting the Healthcare Enterprise" initiatives focus on accelerating collaborative research across institutions and on providing tools and services directly to patients, allowing them to become more active, engaged participants in both their own healthcare and the broader research community.

1998   In July of 1998, with 10 other colleagues, I helped to launch the Virtual PICU. The vision of the Virtual PICU was (and remains) to "…create a common information space for the international community of care givers providing critical care for children. Every critically ill child will have access to the Virtual PICU that will provide ready access to the essential information required to optimize their outcome." The four Aims identified in 1998 were to "…improve the quality of inferences from anecdotal data"; to provide "…educational initiatives …directed at improving educational levels and efficiency in pediatric critical care"; "To improve quality"; and "To develop pediatric critical care telemedicine."

              Of note, I am working now to deliver on Aims 1, 3 and 4. After its launch, the Virtual PICU launched the Virtual PICU System (VPS), which is a shared quality improvement database used by more than 100 children's facilities.

2002   Within the Cerner Corporation, I built Cerner Critical Care and led the development, alpha and beta testing, and deployment of Cerner's critical care solution (called "INet). The solution is now widely deployed in most Cerner sites. It has been applied to the critical care environments and is also widely deployed in acute care environments of all varieties. If measured solely by the number of "live beds," the group has produced multiple orders of magnitude results.

2017   I created (with four other colleagues) a non-profit organization called Machine Learning for Health Care (MLforHC) (see: www.mlforhc.org). Currently, I am the treasurer. The mission of the organization is to run an annual meeting and promote collaborations between the computer science machine learning communities and clinicians. Even before creation of MLforHC, in 2016, we were the first healthcare machine learning meeting for which the presented papers were published. The 2017 meeting was the first to be hosted outside of the original meeting site and sold all available seats. The 2018 also sold out. Acceptance rates for submitted papers for both meetings was about 25% and the proceedings are archived in the *Journal of Machine Learning Research*. In the last month, the proceedings have been PubMed listed.

      Because of my leadership in the field of Machine Learning and Artificial Intelligence more broadly, I was asked to join the National Academy of Medicine's Digital Learning Collaborative as

well as write a chapter for the National Academy of Medicine's recent book (see BC13).

2019   Given my expertise in mathematical modeling and pediatric critical care quality, I was chosen as a consultant to work with an Australian company (Trice), which was appointed by the Women's and Children's Hospital to deliver the largest hospital simulation project ever undertaken in Australia. Simulation will help inform the design of key areas of the new hospital—the Paediatric Emergency Department, Operating Theatres, Outpatients Clinics, and Imaging—and look at patient journeys throughout the hospital. Because of the wildfires and then the pandemic, work has not yet begun.

ORGANIZATIONAL ACTIVITIES

Institutional Administrative Appointments

1983–1984	Director of Inpatient Services, Director of the Residency Program, Department of Pediatrics, Baltimore City Hospital, Baltimore, MD
1989–1991	Chair, Ribavirin Ad Hoc Committee, Children's Hospital, Boston, MA
1989–1991	Chair, Central Venous Line Cannulation Task Force, Children's Hospital, Boston, MA
1989–1994	Member, Pharmacy Committee, Children's Hospital, Boston, MA
1989–1994	Member, Infection Control Committee, Children's Hospital, Boston, MA
1991–1995	Medical Director, Pediatric Respiratory Therapy, Children's Hospital, Boston, MA
1991–1995	Director, Multidisciplinary Intensive Care Unit, Children's Hospital, Boston, MA
1991–1996	Director, Extracorporeal Membrane Oxygenation Program, Children's Hospital, Boston, MA
1996–2002	Member, Clinical Systems Advisory Committee, Johns Hopkins Hospital, Baltimore, MD
1996–2002	Director, Extracorporeal Membrane Oxygenation Program, The Johns Hopkins Hospital, Baltimore, MD
1996–2002	Medical Director, Pediatric Respiratory Therapy, The Johns Hopkins Hospital, Baltimore, MD
1997–2002	Member, Critical Care Committee, The Johns Hopkins Hospital, Baltimore, MD
1997–2002	Clinical Director, Pediatric Intensive Care Unit, The Johns Hopkins Hospital, Baltimore, MD
1997–2000	Liaison, Respiratory Therapy, The Kennedy Krieger Institute, Baltimore, MD
1998–1999	Interim Medical Director, Respiratory Therapy, The Johns Hopkins Hospital, Baltimore, MD
1998–2002	Member, Medical Care Evaluation Committee, The Johns Hopkins Hospital, Baltimore, MD
1998–2002	Medical Director, Respiratory Therapy, The Johns Hopkins Hospital, Baltimore, MD
2000–2002	Participant, Johns Hopkins School of Medicine Leadership Development Program, Baltimore, MD
2007–2009	Co-chair, Critical Care Information Technology Committee, The Johns Hopkins Hospital, Baltimore, MD
2009–2016	Fellowship Director, Pediatric Critical Care, The Johns Hopkins Hospital, Baltimore, MD
2012-present	Member, Institutional Review Board, The Johns Hopkins University School of Medicine, Baltimore, MD
2014–2017	Pediatric Critical Care Physician Champion, EPIC
2016-present	Member, ETS Innovation Committee / TIC Review Board
2017-present	Member, Medical Device Integration Committee, The Johns Hopkins Hospital, Baltimore MD
2018–present	Associate Director, ACCM Informatics Division
2020-present	Member, Alarm Committee, The Johns Hopkins Hospital, Baltimore MD
2022-present	Member, Data Trust, The Johns Hopkins University School of Medicine, Baltimore, MD

Editorial Activities

Editorial board appointments

2001–2017	Editorial Board Member, *Pediatric Critical Care Medicine*
2017-present	Associate Editor, *Pediatric Critical Care Medicine*
2018-present	Editorial Board Member, *Critical Care Explorations* (CCE)

Journal peer review activities
> *npj Digital Medicine*
> *New England Journal of Medicine*
> *Journal of the American Medical Association*
> *Critical Care Medicine*
> *Intensive Care Medicine*
> *Chest*
> *Healthcare Environments Research and Design*
> *International Journal of Medical Informatics*
> *Transactions on Modeling and Computer Simulation*
> *Journal of the American Medical Informatics Association*
> *Journal of Clinical Informatics*
> *Applied Clinical Informatics*
> *Critical Care*
> *Medicine*
> *Pediatric Critical Care Medicine*
> From a 16 September 2019 email, "…You are among our top 25 reviewers for this past year, placing you in an elite group of reviewers who have evaluated and provided feedback on an impressive number of manuscripts. We commend you for this accomplishment…". Patrick M. Kochanek, MD, MCCM, Editor-in-Chief, *Pediatric Critical Care Medicine*
> *Pediatric Research*

Other peer review activities: None

Advisory Committees, Review Groups/Study Sections
1990-1994	Annual New England ECMO Symposium, Course Director
1994-1997	Extracorporeal Life Support Organization, Chairman, Protocols Committee
1996-1997	Working Group for the Epidemiology Study on ARDS, Hoechst Marion Roussel
1997-2000	Anesthesiology and Respiratory Therapy Devices Panel Medical Devices Advisory Committee, Center for Devices and Radiological Health Federal Drug Administration
1997	Design Committee, Randomized Clinical Trial of Surfactant for ARDS in children, Ony Inc.
1998–present	Board of Directors, Virtual PICU
2001	Secretary, Institute for Medical Knowledge Implementation
2003	Study Section Member, ARDS, National Institutes of Maternal and Child Health, NIH
2012-present	Board of Directors and Organizing Committee for Machine Learning in Health Care (MLHC).
2017-present	Digital Learning Collaborative, National Academy of Medicine
2018	Study Section Member and Alternate Chairperson, Pediatric Special Emphasis Panel, NIH
2019	Study Section Member, Pediatric Special Emphasis Panel, NIH
2019	Invited Reviewer, University of Michigan Precision Health Investigators Awards
2020	Invited Reviewer, University of Maryland, Baltimore (UMB), Institute for Clinical and Translational Research (ICTR) Accelerated Translational Incubator Pilot (ATIP) Grant Program.
2020-present	Member, Interagency Modeling and Analysis Group – Multi-scale Modeling Consortium Working Group, entitled Multiscale Modeling And Viral Pandemics. National Institutes of Health, Bethesda MD
2021	Member, Developmental and Exploratory Clinical Investigation of DEcision-support systems driven by Artificial Intelligence (DECIDE-AI) Working Group, Oxford UK

Professional Societies
1984–1993	American Society of Anesthesiologists
1985–present	Society for Critical Care Medicine

	1998–2002	Member, Electronic Communication Committee
	1999–2001	Member, Project Impact Technical Committee
	2000–2001	Vice-Chairman, Electronic Communication Committee

2001–2002	Chairman, Electronic Communication Committee
2003–2005	Industry Partner, Coalition for Critical Care Excellence.
2016-2019	Member, ICU Design Committee

1988–1997	American Academy of Pediatrics
1988–1993	American Medical Association
1988–1993	Massachusetts Society of Anesthesiologists
1988–1996	Massachusetts Medical Society

1993–1996	Member, Committee on Information Technologies
1988–1996	Suffolk District Medical Society
1994–1995	Delegate to House of Delegates

1988–2002	Extracorporeal Life Support Organization

1994–1997	Chairman, Protocols Committee
1994–1997	Member Steering Committee

1992–present	American Medical Informatics Association

2012-	Founding Member, Critical Care Informatics Working Group

1994–present	American Association of Artificial Intelligence (now, Association for the Advancement of AI)
1995–2002	American Thoracic Society
2004–2013	Association of University Anesthesiologists
2010–2013	American Telemedicine Association

Conference Organizer
JHMI/Regional: None

National

8/15	Meaningful Use of Complex Medical Data (MUCMD) (now Machine Learning for HealthCare), Los Angeles, CA
8/16	Meaningful Use of Complex Medical Data (MUCMD) (now Machine Learning for HealthCare), Los Angeles, CA
8/17	Machine Learning for HealthCare, Boston, MA
8/18	Machine Learning for HealthCare, Palo Alto, CA
8/19	Machine Learning for HealthCare, Ann Arbor, MI
8/20	Machine Learning for HealthCare, Virtual
8/21	Machine Learning for HealthCare, Virtual

International: None

Session Chair
JHMI/Regional: None

National

1999	Panel Moderator, Critical Care Information Management. Pediatric Critical Care Colloquium, Portland, OR
2000	Panel Moderator, Critical Care "Informatization." Society for Critical Care Medicine, Orlando, FL
2001	Poster Session Moderator, Technology. Society for Critical Care Medicine, San Francisco, CA
2018	Session Chair, Invited Speaker, AI Innovations for Life Sciences and Health Care Summit, Philadelphia, PA.
2020	Session Moderator, Data Science 101.1, Society of Critical Care Medicine, Orlando, FL
2020	Session Moderator, Machine Learning Implementation, Machine Learning for Health Care, Virtual.

International

2018	Session Chair, AI in Healthcare World Congress 2018, London, England

2019   Session Chair, AI in Healthcare World Congress 2019 London, England

Consultantships
2019   Mathematical Modeling, Women's and Children's Hospital in Adelaide, South Australia

RECOGNITION

Awards, Honors
1979   Alpha Omega Alpha, Rush Medical College, Chicago

Invited Talks, Panels
JHMI/Regional
1992   Invited Discussant, Weekly Senior Rounds, Department of Medicine, Children's Hospital, Boston, MA
1993   Invited Discussant, Weekly Senior Rounds, Department of Medicine, Children's Hospital, Boston, MA
1994   Invited Discussant, Weekly Senior Rounds, Department of Medicine, Children's Hospital, Boston, MA
1997   Invited Lecturer, ARDS. Regional Respiratory Therapy Conference, Baltimore, MD
2017   Invited Speaker, The Future of Clinical Decision Support in the PICU. Children's National Medical Center, Washington, DC.
2019   Grand Rounds, Anesthesiology and Critical Care Medicine, PhysioCloud in the PICU – What Is It? And Why Do We Care? The Johns Hopkins University School of Medicine, Baltimore MD
2020   ACCM Discovery Rounds, Introduction to ACCM PMAP. The Johns Hopkins University School of Medicine, Baltimore MD

National
1994   Invited Lecturer, Extracorporeal Life Support Organization, ARDS State of the Art, Ann Arbor, MI.
1994   Invited Panelist, Extracorporeal Life Support Organization, ECMOnomics, Ann Arbor, MI.
1996   Invited Panelist, American Association of Artificial Intelligence, Impediments to the deployment of AI systems, Palo Alto, CA.
1996   Invited Panelist, Critical Care Informatics. Ninth Annual Pediatric Critical Care Colloquium, Critical Care Informatics, Milwaukee, WI
1997   Invited Panelist, New strategies for ARDS. Tenth Annual Pediatric Critical Care Colloquium, Critical Care Informatics, Milwaukee, WI
1998   Invited Lecturer, Critical Care Informatics, Valley Children's Hospital, Fresno, CA
1998   Invited Lecturer, Critical Care Informatics, Cambridge Health Care, Boston, MA
1999   Panel Moderator, Critical Care Information Management. Pediatric Critical Care Colloquium, Portland, OR
2000   Panel Moderator, Critical Care "Informatization." Society for Critical Care Medicine, Orlando, FL
2001   Poster Session Moderator, Technology. Society for Critical Care Medicine, San Francisco, CA
2004   Panel Member, EMR in Critical Care, American College of Chest Physicians, Seattle, WA
2004   Invited Lecturer, Clinical Relevance, Standardization Meeting, Developing Functional Requirements and Assessing the Regulatory Model for Medical Device Plug-and-Play Connectivity. CIMIT and FDA, Washington, DC.
2005   Invited Panelist, Computers in Critical Care, Society of Critical Care Medicine, Chicago, IL
2006   Invited Lecturer, Evidence-based Medicine: Research to Practice. Healthcare Information Technology-Workshops, Boston, MA
2007   Invited Panelist, Improving Patient Safety Through Medical Device Interoperability and High Confidence Software, Joint Workshop on High Confidence Medical Devices, Software and Systems and Medical Device Plug-and-Play Interoperability, Cambridge, MA

2008	Invited Discussant, Informatics for Integrating Biology and the Bedside, Boston, MA
2009	Invited Panelist, Integrating IT and Medical Devices for Improved Clinical and Financial Outcomes, 6th Annual World Health Care Congress, Washington, DC
2012	Clinical Logistics. Pediatrics Grand Rounds. Riley Children's Hospital. Indiana University.
2012	Invited Lecturer, Winter Simulation. Washington, DC
2013	Workshop Lecturer, Clinical Decision Support, AMIA ICU Informatics workshop, Washington, DC
2013	Invited Panelist, INFORMS Analytics, Washington, DC
2014	Workshop Lecturer, Clinical Decision Support, AMIA ICU Informatics workshop, Washington, DC
2014	Invited Lecture, Modular Multi-Parameter Clinical Decision Support on an EMR Independent Platform. INFORMS Annual Meeting, San Francisco, CA
2015	Invited Panelist, Avoiding Crosstalk in an Increasingly Complex Setting. Boston Biomedevice Conference, Boston, MA
2015	Pediatric Grand Rounds, The Future of Healthcare IT. University of Virginia, Charlottesville, VA.
2017	Invited Speaker, Machine Learning and Big Data in Healthcare 101 Leveraging Large Amounts of Data to Achieve Data-Driven Insights. Machine Learning and AI in Health Care, Boston, MA
2017	Invited Speaker, The Future of Clinical Decision Support in the PICU. Tom Rice Summit. Transforming Pediatric Critical Care. How Data Analytics Will Change Your Practice, Milwaukee WI.
2017	Invited Panelist, Workshop on Interactive Systems in Healthcare, Washington, DC
2017	Invited Panelist, National Academy of Medicine, Digital Learning Collaborative. The Role of Data Integration and Sharing in Enhancing the Capabilities of Machine Learning Algorithms to Improve Health and Health Care, Washington, DC.
2017	Invited Discussant, National Academy of Medicine, Leadership Consortium for a Value and Science-Driven Health System. Purchasing Interoperability in Health and Health Care. Washington, DC.
2018	Invited Speaker and Invited Panelist. SSH Forum on Modeling & Simulation, Los Angeles, CA.
2018	Invited Speaker, AI at the Bedside: from Obfuscation Past Bias to Disambiguation for Value. Machine Learning and AI in Health Care, Washington, DC
2018	Session Chair, Invited Speaker, AI Innovations for Life Sciences and Health Care Summit. Philadelphia, PA.
2018	Invited Panelist, AI at the Bedside, Precision Medicine Leaders' Summit. Jersey City, NJ.
2018	Invited Speaker, The Changing Data: Predictive Analytics and AI. 25th Pediatric Critical Care Colloquium, Baltimore, MD
2019	Invited Speaker, Bedside Clinical Simulation: Ubiquitous Imprecision in Need of Innovation. The International Meeting on Simulation in Healthcare, San Antonio, TX.
2019	Invited Speaker, Topic Prediction of Clinical Decompensation Using Physiologic Time Series and Electronic Medical Record Data, Society of Critical Care Medicine, San Diego, CA.
2019	Invited Speaker, Integrating Artificial Intelligence Technologies into Clinical Care, Artificial Intelligence (AI) in Healthcare Summit, Orlando, FL.
2019	Invited Discussant, The Federal Listening Session on Interoperability of Medical Devices, Data, and Platforms to Enhance Patient Care, FDA, Silver Spring, MD.
2019	Session Chair, Machine Learning for Health Care, Ann Arbor, MI.
2019	Invited Speaker, Integrating Artificial Intelligence Technologies into Clinical Care for Infectious Disease, AI Innovations for Life Science, Washington DC.
2019	Invited Speaker, Artificial Intelligence in Healthcare: The Hope, The Hype, The Promise, The Peril, National Academy of Medicine, Stanford, CA.
2020	Invited Speaker, The Clinical Impact of Physiologic Time Series Analysis, Society of Critical Care Medicine, Orlando, FL.
2020	Session Moderator, Data Science 101.1 Society of Critical Care Medicine, Orlando, FL.

2020	Invited Panelist, Enabling Point-of-Care Technologies, Molecular Medicine Tri-Conference, San, Francisco, CA.
2021	Invited Speaker, Remote ICU: Has the time past, is it now, must it evolve? Business Research Intelligence Network's Remote Patient Monitoring Summit, Virtual.
2022	Grand Rounds, Critical Care Big Data Mining with a focus on Sepsis/Septic Shock. St. Jude Children's Research Hospital, Memphis, TN.

International

1996	Invited Lecturer, 2nd World Congress of Pediatric Intensive Care, Data Management. Rotterdam, The Netherlands
1996	Invited Lecturer, 2nd World Congress of Pediatric Intensive Care, Why the Prognosis of ARDS Is Improved. Rotterdam, The Netherlands
1996	Panel Moderator, 2nd World Congress of Pediatric Intensive Care, Monitoring. Rotterdam, The Netherlands
1996	Invited Lecturer, 2nd World Congress of Pediatric Intensive Care, Critical Care Informatics, Is There a Need for Standardization. Rotterdam, The Netherlands
1996	Invited Lecturer, Use of Web for Data Management in ICU, Creteil, France
1997	Invited Lecturer, Telemedicine in Critical Care-Possibilities and Limitations. 7th International Symposium on Critical Care Medicine, Bremen, Germany
2000	Track Conveyor, Critical Care Information Management. 3rd World Congress of Pediatric Critical Care, Montreal, Canada
2007	Invited Lecturer, 4th National Pediatric Emergency Medicine and Intensive Care Congress, Ankara, Turkey
2011	Invited Lecturer, International Society for Complexity in Acute Illness, Bonn, GE.
2013	Critical Care Informatics, University of Puerto Rico, San Juan, PR
2014	Workshop Lecturer, Morbidity and Mortality Conferences, Pediatric Academic Societies, Vancouver, BC, Canada.
2018	Session Chair, Invited Speaker. AI in Healthcare World Congress 2018, Using AI to Transform the Healthcare Industry. Quicker. Cheaper. More Effective. London, England.
2019	Session Chair, Invited Speaker. AI in Healthcare World Congress 2019; AI at the Bedside: Trust Me I'm a Machine. London, England.
2021	Invited Panelist, Modeling and Simulation for Patient Safety: COVID-19 Case Example. 21st International Meeting on Simulation in Healthcare, Virtual

Visiting Professorships

1993	University of North Carolina, Department of Pediatrics
1993	Northwestern University, Department of Pediatrics
1999	National University of Singapore, Department of Computer Sciences
2004	Children's Hospital, Singapore
2008	Queen Elizabeth Hospital, Hong Kong, China

OTHER PROFESSIONAL ACCOMPLISHMENTS

Selected abstracts
1. Aoki M, Jonas RA, Nomura F, Stromski M, Tsuji M, **Fackler J**, Hickey PR, Holtzman D. Aprotinin enhances acute recovery of cerebral metabolism after circulatory arrest. Circulation. 1992;86(4):7272.
2. Tsuji M, **Fackler J**, Naruse H, Du Plessis A, Holtzman D, Volpe J. Cerebral hemoglobin changes with ECMO measured by near infrared spectroscopy. Ninth Annual ECMO Symposium, Keystone, CO, 1993.
3. **Fackler J**, Wilson J, Thompson J, Roberts J. Nitric oxide has no effect on hypoxia associated with congenital diaphragmatic hernia: preliminary data. Ninth Annual ECMO Symposium, Keystone, CO, 1993.

4.   Gaston B, Fackler JC, Drazen JM, Singel DJ, Reilly J, Mullins M, Loscalzo J, Stamler JS. Nitrogen-oxides in normal and abnormal tracheal secretions. Am Rev Respir Dis. 1993;147(4): A455.

5.   **Fackler J**, Liu A, Kohane IS. A fully integrated ECMO workstation: Progress report. Extracorporeal Life Support Organization, Dearborn, MI, 1994.

6.   Kourembanas S, McQuillan L, Christou H, Adatia I, Van Marter L, Kane J, Thompson J, **Fackler J**, Wessel D, Stark A. Inhaled nitric oxide alters endogenous endothelin-1 and cGMP levels in newborns with persistent pulmonary hypertension. Society of Pediatric Research, 1994.

7.   Fauza DO, Hines MH, **Fackler JC**, Slavin R, DiFiore JW, Hirschl R, Wilson JM. Continuous positive airway pressure with perfluorocarbon accelerates postnatal lung growth. Annual Clinical Congress, American College of Surgeons, 1995.

8.   Kohane IS, Greenspun P, **Fackler J,** Szolovits P. Accessing pediatric electronic medical record systems via the world wide web. Pediatr Res. 1994;37(4 part 2):A139.

9.   Toro-Figueroa LO, Meliones JN, Curtis SE, Thompson AE, Hirschl RB, **Fackler JC**, Newth CJ, Leach CL, Fuhrman BP, LiquiVent Multi-Institutional Study Group. Perflubron partial liquid ventilation (PLV) in children with ARDS: A safety and efficacy pilot study. Crit Care Med. 1996;24(1):A150.

10.   Green TP, Timmons, Otwell D, Fackler JC, Moler, FW, Thompson AE, Sweeney, MF. The impact of extracorporeal membrane oxygenation on survival in pediatric patients with acute respiratory failure. Crit Care Med. 1996;24(1):A140.

11.   **Fackler J**, Steinhart C, Nichols D, Bohn D, Heulitt M, Green T, Martin L, Newth K, Klein M, Ware J. ARDS and ECMO: Preliminary data from a randomized clinical trial. Intensive Care Med 1996;22:S169.

12.   Bindl L, Kühl G, Lasch P, Appel, Möller J, Hammer J, Numa A, Newth CJL, Peters MJ, Kiff K, McErlean B, Yates R, Hatch DJ, Tasker RC, Martínez-Azagra A, Flores JC, Bravo NG, Mora E, Pérez JG, Feickert HJ, Kayser C, Sasse M, **Fackler J**, Steinhart C, Nichols D, Bohm D, Heulitt M, Green T, Martin L, Newth K, Klein M, Ware J, Sagy M, Poustchi-Amin M, Nimkoff L, Silver P, Shikowitz M, Leonidas JC. Acute lung injury/Airway. Intensive Care Med. 1996;22(Suppl 2):S168–9.

13.   Heulitt M, **Fackler J**, Green T, Steinhart C, Nichols D, Ware J, Fiser D. Morbidity in survivors of pediatric acute respiratory distress syndrome: A multicenter study. Am J Respir Crit Care Med 1997;155:A503.

14.   **Fackler J**, Bohn D, Green T, Heulitt, M, Hirshl R, Klein M, Martin L, Newth K, Nichols D, Steinhart C, Ware J. ECMO for ARDS: Stopping a RCT. Am J Respir Crit Care Med 1997;155:A504.

15.   Tsien CL, Kohane IS, **Fackler JC**, Curley M. Decreasing false alarms in the intensive care unit: Moving along versus shifting the receiver operating characteristic curve. Pediatrics 1998;102(suppl):692.

16.   Klein G, Patterson ES, Weinger WB, **Fackler JC**, Pascale C. The role of human factors in healthcare–2020, Human Factors and Ergonomics Society's 48th Annual Meeting, New Orleans, LA, 2004.

17.   Goldman JM, **Fackler J**, Howse J, Philip JH, Jopling MW, Whitehead S. Consumer empowerment: Healthcare delivery organizations demand medical device plug-and-play interoperability. American Society of Anesthesiologists Annual Meeting Scientific Exhibit #S10, 2008.

18.   Holcroft JJ, Lehmann C, Mann S, Dwyer J, **Fackler J**, Birdson M, McIltrot K, Easley RB. Non-invasive positive pressure ventilation utilization in children with respiratory failure. American Thoracic Society, 2010; A3905.

19.   Ordóñez P, Armstrong T, Oates T, Fackler J. Classification of multivariate vital signs using stacked bags-of-patterns. Meaningful Use of Critical Care Data, Los Angeles, CA, 2011.

20.   Ordóñez P, Oates T, Lombardi M, **Fackler J**, Holmes KW, Lehmann CU. Visualization of multivariate time series data in a neonatal ICU. Meaningful Use of Critical Care Data, Los Angeles, CA, 2011.

21.   Cifra T. (mentor and presenter) **Fackler J**. Transforming the morbidity and mortality conference into a powerful tool for improving safety and quality. Workshop Pediatric Academic Societies, Vancouver, BC, 2014.

22.   Woods-Hill C, Duval-Arnould J, Su E, Hunt EA, **Fackler J**. ICU capacity strain as a risk factor for increased bedside emergency events in a pediatric ICU. Society of Critical Care Medicine Annual Meeting, Orlando, FL, 2016.

23.   Woods-Hill C, Nelson K, Voskertchian A, Ascenzi J, **Fackler J**, Milstone A. Improving blood culture utilization in critically ill children. Society of Critical Care Medicine Annual Meeting, Orlando, FL, 2016.

24.   Sick-Samuels AC, Woods-Hill CZ, **Fackler JC**, Tamma PD, Gadala A, Voskertchain A, Colantuoni E, Milstone AM. The impact of a blood culture utilization intervention on antibiotic use in a pediatric intensive care unit. SHEA Spring Conference, St. Louis, MO, 2017.

25.   Hoops K, **Fackler J**, King A, Boyle K, Herrup E, Manzo A, Milstone A, Woods-Hill C. Clinician prediction of bacteremia in critically ill children: How good is our diagnostic instinct? Society of Critical Care Medicine Annual Meeting, San Antonio, TX, February 2018.

26.   O'Hara S, Patterson E, Toft Klar R, **Fackler J**, Ascenzi, J. Macrocognition: a framework for optimal ICU design and interprofessional team interactions - from method to theory development – mHCBE. HFES International Symposium on Human Factors and Ergonomics in Health Care. Boston, MA, March 2018

27   Klaus S, **Fackler J**. Using predictive analytics to save lives. HIMSS, Las Vegas, NV, February 2018.

28.   Wellner B, Klaus S, Xie A, **Fackler J**, Woods-Hill C, Milstone A. Predicting Septic Shock Using Machine Learning. Pediatric Academic Societies. Toronto, Canada, May 2018.

29.   Xie A, Hoops K, **Fackler J**, King A, Milstone A, Woods-Hill C. Understanding the Cognitive Work Underlying Blood Culture Use and Sepsis Diagnosis: Implications for Clinical Decision Support Development. International Ergonomics Association. Florence, Italy, August 2018

30.   Sick-Samuels AC, Hoops K, **Fackler JC**, Milstone AM. Reasons Pediatric Providers Obtain Endotracheal Aspirate Cultures and How Results Inform Patient Management. IDWeek 2018, San Francisco, CA, October 2018.

31.   Bergmann J, Hoops K, Sick-Samuels A, Milstone A, **Fackler J.** A Framework for Ventilator-Associated Complication Detection and Prediction. Society of Critical Care Medicine, San Diego, CA, 2019.

32.   Dante S, McNelly C, Bernier M, Bembea, M, **Fackler J**. Independent Lung Ventilation in a Toddler with Pneumonia Improved Dead Space Ventilation on VA ECMO. Society of Critical Care Medicine, San Diego, CA, 2019.

33.   Woods-Hill CZ, Xie A, King A, Koontz D, Voskertchian A, Colantuoni E, Miller M, **Fackler J**, Milstone A, and the *Bright Star Collaborative* authorship group. A National Survey of Blood Culture Practices to Inform a Diagnostic Stewardship Initiative. Society of Critical Care Medicine, San Diego, CA, 2019.

34.   Sick-Samuels AC, Hoops K, **Fackler JC**, Milstone AM. Reduction in Endotracheal Aspirate Cultures after Implementation of a Diagnostic Stewardship Intervention in a Pediatric Intensive Care Unit. IDWeek 2019, Washington, DC, October 2019.

35.   Xie A, Koontz D, Voskertchian A, **Fackler J**, King A, Milstone A, Woods-Hill C. Human Factors and Ergonomics-Based Work System Assessment to Facilitate Quality Improvement Dissemination. Ergonomics and Human Factors Conference. Stratford-upon-Avon, CV37 6YR, United Kingdom, April 2020.

36.   Booth L, Stockwell D, Fackler J, Sick-Samuels A, Milstone A. Variation in culture ordering practices among pediatric intensive care unit (PICU) clinicians. 10th Congress of the World Federation of Pediatric Intensive and Critical Care Societies. Mexico City, Mexico, 2020.

37.   Wang Z, Kyranakis S, Swaminathan A, Chen C, Shi W, Bergmann J, **Fackler J**, Ruchti T, Greenstein J, Winslow R. Predicting hypoxemia in ICU patients. BMES. Virtual Annual Meeting, 2020.

38.   Bergmann J, Wang Z, Kyranakis S, Ananya S, Chen C, Shi W, Greenstein J, Winslow R, **Fackler J***, Ruchti T. Predicting hypoxemia in ICU patients. Crit Care Med. 2021;1:167. *Co-Senior Author

39.   Hansen D, Levin A, **Fackler J**, Rosen R, Khaleghzadegan S, Yenokyan G, Stockwell D. Contributors to perceived workload strain in the pediatric ICU. Crit Care Med. 50(1):654, January 2022.

40.   Razan A, **Fackler JC**, Kudchadkar S. Making PRISM Easy: Development of a STATA command for risk of mortality calculation. Crit Care Med. January 2023.

41.   Kenet AL, Pemmaraju R, Ghate S, Raghunath S, Zhang Y, Yuan M, Wei TY, Desman JM, Greenstein JL, Taylor CO, Ruchti T, **Fackler J**, Bergmann. Predicting Cardiac Arrest in the Pediatric Intensive Care Unit Using Machine Learning. Crit Care Med. January 2023.

42.   Woods-Hill CZ, Colantuoni E, Koontz D. Xiao, X, Xie A, Miller M, **Fackler J**, Voskertchian A, Milstone A. Reducing blood culture overuse in critically ill children: sustainability of the BrighT STAR program**.** Crit Care Med. January 2023.