

Park Lab | Program for Hospital and Intensive Care Informatics

Select Publications

Listing of relevant publications. For More Complete Bibliography:

<https://www.ncbi.nlm.nih.gov/myncbi/1jC6vxijdi-56/bibliography/public/>

2022

1. Claassen J, Park S. Spontaneous Subarachnoid Haemorrhage. Lancet. 2022 Sep 10;400(100355):846-862. Epub 2022 Aug 16. PMID: [35985353](#).
2. Ranard BL, Megjhani M, Terilli K, Yarmohammadi H, Ausiello J, Park S. Heart rate variability and adrenal size provide clues to sudden cardiac death in hospitalized COVID-19 patients. J Crit Care. 2022 Jul 18;71:154114. PMID: [35863211](#) PMCID: PMC9291038.
3. Rubinos C*, Kwon SB*, Megjhani M, Terilli K, Wong B, Cespedes L, Ford J, Reyes R, Kirsch H, Alkhachroum A, Velazquez A, Roh D, Agarwal S, Claassen J, Connolly ES Jr, Park S. Predicting Shunt Dependency from the Effect of Cerebrospinal Fluid Drainage on Ventricular Size. Neurocrit Care. 2022 Jun 25. Online ahead of print. PMID: [35750930](#).
4. Weiss M, Albanna W, Conzen C, Kastenholz N, Seyfried K, Ridwan H, Weismann M, Veldeman M, Schmidt T, Tas J, Megjhani M, Schulze-Steinen H, Clusmann H, Aries MJ, Park S, Schubert GA. Intraarterial nimodipine versus induced hypertension for delayed cerebral ischemia – a modified treatment protocol. Stroke. 2022 Aug;53(8):2607-2616. Epub 2022 Jun 8. PMID: [35674046](#).
5. Rasulo FA, Calza S, Robba C, Taccone FS, Biasucci DG, Badenes R, Piva S, Savo D, Citerio G, Dibu JR, Curto F, Merciadri M, Gritti P, Fassini P, Park S, Lamperti M, Bouzat P, Malacarne P, Chierigato A, Bertuetti R, Aspidi R, Cantoni A, McCredie V, Guadrini L, Latronico N. Transcranial Doppler as a screening test to exclude Intracranial hypertension in brain-injured patients: the IMPRESSIT-2 prospective multicenter international study. Crit Care. 2022 Apr 15;26(1):110. PMID: [35428353](#).
6. Megjhani M, Weiss M, Kwon SB, Ford J, Nametz D, Kastenholz N, Fogel H, Velazquez A, Roh D, Agarwal S, Connolly Jr ES, Claassen J, Schubert GA, Park S. Vector angle analysis of multimodal neuromonitoring data for real-time prediction of delayed cerebral ischemia. Neurocrit Care. 2022 Aug;37(Suppl 2):230-2336. Epub 2022 Mar 30. PMID: [35352273](#).
7. Cao H, Finer J, Megjhani M, Nametz DC, Lorenzi V, Mamykina L, Meyers R, Rossetti SC, Park S. Machine Learning Model Deployment Using Real-Time Physiological Monitoring: Use Case of Detecting Delayed Cerebral Ischemia. 2022 IEEE Healthcare Innovations and Point of Care Technologies (HI-POCT), 2022, pp 42-45, doi:10.1109/HI-POCT54491.2022.9744076.
8. Weiss M, Albanna W, Conzen C, Megjhani M, Tas J, Seyfried K, Kastenholz N, Veldeman M, Schmidt TP, Schulze-Steinen H, Wiesmann M, Clusmann H, Park S, Aries M, Schubert GA. Optimal cerebral perfusion pressure during delayed cerebral ischemia after aneurysmal subarachnoid hemorrhage. Crit Care Med. 2022 Feb 1;50(2):183-191. PMID: [35100191](#).

2021

9. Ranard BL, Megjhani M, Terilli K, Doyle K, Claassen J, Pinsky MR, Clermont G, Vodovotz Y, Asgari S, Park S. Identification of Endotypes of Hospitalized COVID-19 Patients. Front Med (Lausanne). 2021 Nov 11;8:770343. PMID: [34859018](#). PMCID: PMC8632028.
10. Day JD*, Park S*, Ranard BL, Singh H, Chow CC#, Vodovotz Y#. Divergent COVID-19 Disease Trajectories Predicted by a DAMP-Centered Immune Network Model. *Co-First Authors; #Co-Senior Authors. Front Immunol. 2021;12:754127. eCollection 2021. PMID: [34777366](#); PMCID: 8582279.
11. Megjhani M, Terilli K, Kalasapudi L, Chen J, Carlson J, Miller S, Badjatia N, Hu P, Velazquez A, Roh DJ, Agarwal S, Claassen J, Connolly ES, Hu X, Morris N, Park S. Dynamic Intracranial Pressure Waveform Morphology Predicts Ventriculitis. Neurocrit Care. 2022 Apr;36(2):404-411. Epub 2021 Jul 30. PMID: [34331206](#).
12. Veldeman M, Albanna W, Weiss M, Park S, Hoellig A, Clusmann H, Helbok R, Temel Y, Schubert GA. Invasive Multimodal Neuromonitoring in Aneurysmal Subarachnoid Hemorrhage – a Systematic Review. Stroke. 2021 Nov;52(11):3624-3632. Epub Jul 26. PMID: [34304602](#).

13. Megjhani M, Terilli K, Kaplan A, Wallace BK, Alkhachroum A, Hu X, Park S. Use of Clustering to Investigate Changes in Intracranial Pressure Waveform Morphology in Patients with Ventriculitis. *Acta Neurochir Suppl*. 2021;131:59-62. PMID: [33839819](#).
14. Megjhani M, Terilli K, Weiss M, Savarraj JP, Chen LH, Alkhachroum A, Roh DJ, Agarwal S, Connolly ES Jr, Velazquez A, Boehme A, Claassen J, Choi H, Schubert G, Park S. Dynamic Detection of Delayed Cerebral Ischemia: A Study in Three Centers. *Stroke*. 2021 Apr;52(4):1370-1379. Epub 2021 Feb 18. PMID: [33596676](#), PMC8247633.
15. Fedriga M, Czigler A, Nasr N, Zeiler FA, Park S, Donnelly J, Papaioannou V, Frisvold SK, Wolf S, Rasulo F, Sykora M, Smielewski P, Czosnyka M. Autonomic Nervous System Activity During Refractory Rise in Intracranial Pressure. *J Neurotrauma*. 2021 Jun 15;38(12):1662-1669. Epub 2021 Jan 12. PMID: [33280491](#).
16. Savarraj JPJ, Hergenroeder G, Zhu L, Chang T, Park S, Megjhani M, Vahidy F, Zhao Z, Kitagawa R, Choi HA. Machine Learning to Predict Delayed Cerebral Ischemia and Outcomes in Subarachnoid Hemorrhage. *Neurology*. 2021 Jan 26;96(4):e553-e562. Epub 2020 Nov 12. PMID [33184232](#).

2020

17. Rasulo F, Piva S, Park S, Oddo M, Megjhani M, Cardim D, Matteotti I, Gandolfi L, Robba C, Taccone FS, Latronico N. The association between peri-hemorrhagic metabolites and cerebral hemodynamics in patients with spontaneous intracerebral hemorrhage: an international multicenter pilot study analysis. *Front Neurol*. 2020 Oct 26;11:568536. PMID: [33193007](#).
18. Alkhachroum A*, Terilli K*, Megjhani M*, Park S. Harnessing Big Data in Neurocritical Care in the Era of Precision Medicine. *Curr Treat Options Neurol* 22,15 (2020). <https://doi.org/10.1007/s11940-020-00622-8>.
19. Stember JN, Terilli K, Perez E, Megjhani M, Cooper C, Jambawalikar S, Park S. Surface Point Cloud Ultrasound with Transcranial Doppler: coregistration of surface point cloud ultrasound with magnetic resonance angiography for improved reproducibility, visualization and navigation in transcranial Doppler ultrasound. *J Digit Imaging*. 2020 Aug;33(4):930-936. Epub 2020 Feb 19. PMID: [32076925](#).
20. Alkhachroum A, Megjhani M, Terilli K, Rubinos C, Ford J, Wallace BK, Roh DJ, Agarwal S, Connolly ES, Boehme AK, Claassen J, Park S. Hyperemia in Subarachnoid Hemorrhage Patients is Associated with an Increased Risk of Seizures. *J Cereb Blood Flow Metab*. 2020 Jun;40(6):1290-1299. Epub 2019 Jul 11. PMID: [31296131](#).
21. Megjhani M, Kaffashi F, Terilli K, Alkhachroum A, Esmaili B, Doyle KW, Murthy S, Velazquez AG, Connolly, ES Jr, Roh DJ, Agarwal S, Loparo KA, Claassen J, Boehme A, Park S. Heart Rate Variability as a Biomarker of Neurocardiogenic Injury after Subarachnoid Hemorrhage. *Neurocrit Care*. 2020 Feb;32(1):162-171. Epub 2019 May 15. PMID: [31093884](#), PMC6856427.
22. Park S, Rogers ML (2020) Intensive Care Unit Collaboration and Workflow in the Information Age. In: De Georgia M and Loparo K (eds) *Neurocritical Care Informatics*. Springer, Berlin, Heidelberg.

2019

23. Robba C, Goffi A, Geeraert T, Cardim D, Via G, Czosnyka M, Park S, Sarwal A, Padayachy L, Rasulo F, Citerio G. Brain ultrasonography: methodology, basic and advanced principles and clinical applications. A narrative review. *Intensive Care Med* 2019 Jul;45(7):913-927. Epub 2019 Apr 25. PMID: [31025061](#).
24. Al-Mufti F, Amuluru K, Damodara N, Dodson V, Roh D, Agarwal S, Meyers PM, Connolly ES Jr, Schmidt JM, Claassen J, Park S. Admission Neutrophil-Lymphocyte Ratio Predicts Delayed Cerebral Ischemia Following Aneurysmal Subarachnoid Hemorrhage. *Journal of Neurointerv Surg*. 2019 Nov;11(11):1135-1140. Epub 2019 Apr 12. PMID: [30979846](#).
25. Witsch J, Al-Mufti F, Connolly ES, Agarwal S, Melmed K, Roh DJ, Claassen J, Park S. Statins and perihemorrhagic edema in patients with spontaneous intracerebral hemorrhage. *Neurology*. 2019 Apr 30;92(18):e2145-e2149. Epub 2019 Feb 6. PMID: [30728307](#).
26. Megjhani M, Alkhachroum A, Terilli K, Ford J, Rubinos C, Kromm J, Wallace BK, Connolly ES, Roh D, Agarwal S, Claassen J, Padmanabhan R, Hu X, Park S. An active learning framework for enhancing identification of non-artifactual intracranial pressure waveforms. *Physiol Meas*. 2019 Jan 18;40(1):015002. Epub 2018 Dec 18. PMID: [30562165](#), PMC6681897.
27. Megjhani M, Terilli K, Frey H-P, Velazquez AG, Doyle KW, Connolly Jr ES, Roh DJ, Agarwal S, Claassen J, Elhadad N, Park S. Incorporating High-Frequency Physiologic Data Using Computational Dictionary Learning Improves Prediction of Delayed Cerebral Ischemia Compared to Existing Methods. *Front Neurol*. 2018 Mar 7;9:122. PMID:

[29563892](#).

28. Park S, Megjhani M, Frey H-P, Grave E, Wiggins C, Terilli KL, Roh DJ, Velazquez A, Agarwal S, Connolly ES Jr, Schmidt JM, Claassen J, Elhadad N. Predicting Delayed Cerebral Ischemia after Subarachnoid Hemorrhage Using Physiological Time Series Data. J Clin Monit Comput. 2019 Feb;33(1):95-105. Epub 2018 Mar 20. PMID: [29556884](#), PMC6681895.

2018

29. Megjhani M, Terilli K, Martin A, Velazquez A, Claassen J, Roh D, Agarwal S, Smielewski P, Boehme AK, Schmidt JM, Park S. Deriving PRx and CPPopt from 0.2 Hz data: Establishing Generalizability to Bedmaster users. Acta Neurochir Suppl 2018;126:179-182. PMID: [29492557](#).
30. Francoeur CL, Roh D, Schmidt JM, Mayer SA, Falo MC, Agarwal S, Connolly ES, Claassen J, Elkind MS, Park S. Desmopressin administration and rebleeding in subarachnoid hemorrhage: analysis of an observational prospective database. J Neurosurg 2018 Jan 1:1-7. Online ahead of print. PMID: [29393750](#). PMC6688966.
31. Morris NA, Manning N, Marshall R, Connolly ES, Claassen J, Agarwal S, Roh DJ, Schmidt JM, Park S. Transcranial Doppler Waveforms during Intra-aortic Balloon Pump Counterpulsation for Vasospasm Detection after Subarachnoid Hemorrhage. Neurosurgery. 2018 Sep 1;83(3):416-421. Epub 2017 Jul 21. PMID [28973669](#).

2017

32. Hsu W, Park S, Kahn CE Jr. Sensor, Signal, and Imaging Informatics. Yearb Med Inform 2017 Aug;26(1):120-124. PMID: [29063550](#).
33. Schmidt JM, Park S. (2017). Neurophysiologic Decision Support Systems. Lee K (Ed.). In *The NeuroICU Book (pp 351-360)*. New York: McGraw-Hill Medical.

2016

34. Wanderer JP, Nelson SE, Ehrenfeld JM, Monahan S, Park S. Clinical Data Visualization: The Current State and Future Needs. J Med Syst 2016 Dec;40(12):275. Epub 2016 Oct 27. PMID: [27787779](#).
35. Arroyo-Palacios J, Rudz M, Fidler R, Smith W, Ko N, Park S, Bai Y, Hu X. Characterization of Shape Differences among ICP Pulses Predicts Outcome of External Ventricular Drainage Weaning Trial. Neurocrit Care. 2016 Dec;25(3):424-433. PMID [27106888](#).
36. Roh D, Park S. Brain Multimodality Monitoring: Updated Perspectives. Current Neurology and Neuroscience Reports. 2016;16(6):56-65. PMID: [27095434](#), PMC4863980.
37. Park S, Czosnyka M, Smielewski P. Brain Oxygen Relationship to Cerebral Perfusion Pressure Depends on Tip Location and Time Window: Can Brain O2 be an adjunctive modality for determining optimal CPP? Acta Neurochir Suppl. 2016;122:133-135. PMID: [27165893](#).

2015

38. Citerio G, Park S, Schmidt JM, Moberg R, Suarez JJ, LeRoux PD; Second Neurocritical Care Research Conference Investigators. Data Collection and Interpretation. Neurocritical Care 2015 Jun;22(3):360-368. PMID: [25846711](#).

2014

39. Roederer A, Holmes JH, Smith MJ, Lee I, Park S. Prediction of Significant Vasospasm in Aneurysmal Subarachnoid Hemorrhage Using Automated Data. Neurocritical Care 2014 21(3):444-450. PMID: [24715326](#)
40. Roederer A, Soegaard J, Lee I, Wanderer J, Park S. Wandering Data: A Scalable, Durable System for Effective Visualization of Patient Health Data. Proceedings from 2014 IEEE 27th International Symposium on Computer-Based Medical Systems. P.547-548. DOI: [10.1109/CBMS.2014.131](#).

2013

41. Park S, Kaffashi F, Loparo KA, Jacono FJ. The Use of Heart Rate Variability for the Early Detection of Treatable Complications after Aneurysmal Subarachnoid Hemorrhage. Journal of Clinical Monitoring and Computing 2013;27(4):385-393. PMID: [23615846](#).
42. Goodman D, Kasner SE, Park S. Predicting Early Awakening from Coma after Intracerebral Hemorrhage. Frontiers in Neurology 2013 Oct 16;4:162. PMID: [24137155](#).

2012

43. Fishman M, Jacono FJ, Park S, Jamasebi R, Thungtong A, Loparo KA, Dick TE. A Method for Analyzing Temporal Patterns of Variability of a Time Series from Poincare Plots. Journal of Applied Physiology. 2012 Jul;113(2):297-306. PMID: [22556398](#).
44. Roederer A, Hicks A, Oyeniran E, Lee I, Park S. Clinical Decision Support for Integrated Cyber-Physical Systems: A Mixed Methods Approach. Proceedings of the 2nd ACM SIGHIT International Health Informatics Symposium (IHI '12) 2012 January. P. 871-874. Demo Paper, Miami, FL. DOI:[10.1145/2110363.2110476](#).
45. Chandra M, Minkoff DL, Schenkel SS, Frangos S, Mesquita RC, Kosty JA, Park S, Kofke A, Yodh A. Long Term Monitoring of Cerebral Blood Flow in Subarachnoid Hemorrhage Patients Using Diffuse Correlation Spectroscopy. Biomedical Optics and 3D Imaging OSA Conference Paper. 2012:JM3A.14. doi:[10.1364/BIOMED.2012.JM3A.14](#).
46. Arney D, Mattegunta P, King A, Lee I, Park S, Mullen-Fortino M, Goldman JM. Device Time, Data Logging, and Virtual Medical Devices. Journal of Medical Devices 3/12/2012; 6(1):017596. DOI:[10.1115/1.4026774](#). 2012 *Design of Medical Devices Conference Technical Brief, Minnesota, MN*.

2011

47. Park S, Roederer A, Mani R, Schmitt S, LeRoux PD, Ungar LH, Lee I, Kasner SE. Limitations of Threshold-Based Brain Oxygen Monitoring for Seizure Detection. Neurocritical Care 2011;15(3):469-476. PMID: [21523525](#).
48. Wendell L, Raser J, Kasner S, Park S. Predictors of Extubation Success in Patients with Middle Cerebral Artery Acute Ischemic Stroke. Stroke Res Treat. 2011;2011:248789. PMID: [21977336](#).

2010

49. King A, Roederer A, Chen S, Asare P, Fortino-Mullen M, Park S, Sokolsky O, Lee I. (2010) 'Demo of the Generic Smart Alarm: a Framework for the Design, Analysis, and Implementation of Smart Alarms and Other Clinical Decision Support Systems', In *Wireless Health 2010*, San Diego, CA, October 5-7, 2010, pp. 210-211 (ACM Digital Library). doi: [10.1145/1921081.1921116](#)
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