September 2024

CURRICULUM VITAE

Name:	Salah Al-Zaiti, PhD, RN, CRNP, ANP-BC, FAHA
Current Title:	Professor & Endowed Chair
Mailing Address:	Work – 601 Elmwood Ave., Rochester, NY 14642
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EDUCATION

Undergraduate Degrees

2002–2006 **BSN, Nursing**
The Hashemite University, Amman, Jordan

Graduate Degrees

2008–2010 **MSN, Adult Nurse Practitioner**
State University of New York, Buffalo, NY

2010–2013 **Ph.D., Cardiovascular Nursing**
State University of New York, Buffalo, NY

Postgraduate Certificates

2019 **Machine Learning**
Department of Electrical Engineering, MIT Professional Education Unit
Massachusetts Institute of Technology (MIT), Boston, MA

2020–2021 **Applied Machine Learning**
The Data Science Institute, Executive Education Unit
Columbia University, New York, NY

APPOINTMENTS AND POSITIONS

Academic Appointments

2013–2019 **Assistant Professor, University of Pittsburgh, Pittsburgh, PA, USA**
Departments of Nursing (Primary) and Emergency Medicine (Secondary)

2019–2023 **Associate Professor with Tenure, University of Pittsburgh, PA, USA**
Departments of Nursing (Primary), Cardiology, and Emergency Medicine

2023–2024 **Professor with Tenure, University of Pittsburgh, Pittsburgh, PA, USA**
Departments of Nursing (Primary), Cardiology, Emergency Medicine, and Electrical & Computer Engineering (Secondary)

2024– **Professor & Endowed Chair, University of Rochester, Rochester, NY, USA**
Departments of Nursing (Primary), Cardiology, Emergency Medicine, and Electrical & Computer Engineering (Secondary)

Administrative Appointments

2018–2020 **Director, Interprofessional Education**
School of Nursing, University of Pittsburgh, Pittsburgh PA

2019–2021 **Director, Nursing Honors Program**
School of Nursing, University of Pittsburgh, Pittsburgh PA

2020–2024 **Director, Data Science Core, eHealth Hub**
School of Nursing, University of Pittsburgh, Pittsburgh PA

2020–2024 **Co-Director, T32 Technology in Acute & Chronic Illness**
School of Nursing, University of Pittsburgh, Pittsburgh PA

2021–2023 **Vice Chair of Research**
Department of Acute & Tertiary Care (ATC)
University of Pittsburgh School of Nursing, Pittsburgh, PA

Clinical Experience

2006–2008 **Registered Nurse, Bone Marrow Transplantation**
King Hussein Cancer Center, Amman, Jordan

2010–2011 **Nurse Practitioner, Diabetes Outpatient Clinic**
Diabetes and Endocrinology Center of WNY, Kaleida Health, Buffalo, NY

2018–2019 **Nurse Practitioner (per diem)**
Braddock Health Clinic, Swissvale, PA

Adjunct Appointments

2020– **Affiliated Translational Researcher**
Center for Bio-signal Research, UCSF, San Francisco, CA, USA

2024– **Honorary Professor**
School of Nursing, University of Jordan, Amman, Jordan

LICENSURE & BOARD CERTIFICATIONS

2009– Registered Nurse (New York)
2010– Nurse Practitioner (New York)
2010– Board Certified Adult Nurse Practitioner, American Nurses Credential Center (ANCC)
2013– Registered Nurse (Pennsylvania)
2013– Nurse Practitioner (Pennsylvania)

HONORS & AWARDS

University Awards

Student Awards *(State University of New York, Buffalo NY, USA)*

2006 **Chancellor's Award for Student Excellence** (highest GPA, class of 2006)
2009 **Woodburn Presidential Fellowship**
2009 **Sigma Theta Tau**, Gamma Kappa Chapter, The Honors Society of Nursing
2010 **Anne Sengbusch Award for Excellence in Leadership**
2012 **Graduate Student Excellence in Teaching Award**
2013 **Ruth G. Elder Award for Excellence in Research** (Graduate Category)

Faculty Awards *(University of Pittsburgh, Pittsburgh, PA, USA)*

2019 **Dean's Distinguished Teaching Award**
2020 **Chancellor's Distinguished Teaching Award [link]**
2021 **Senior Vice Chancellor Research Seminar Series** (keynote presentation) **[link]**
2023 **Chancellor's Distinguished Research Award [link]**

Regional Awards

2020 **Nurse Researcher of the Year,** Pittsburgh Magazine **[link]**
2020 **Excellence in Nursing Research,** Nightingale Awards of Pennsylvania **[link]**

National & International Awards

2011 **Jos Willems Young Investigator Finalist,** ISCE, San Jose, CA
2012 **Best Poster Award,** ISCE, Birmingham, AL
2013 **Jos Willems Young Investigator Finalist,** ISCE, San Jose, CA
2014 **Martha N. Hill New Investigator Award,** CVSN Council, AHA **[link]**
2015 **Marie Cowan Promising Young Investigator Award,** CVSN Council, AHA **[link]**
2017 **Fellow of the American Heart Association (FAHA),** American Heart Association (AHA)
2021 **Research Article of the Year Award,** AHA, (Published in *Nature Communications* **[link]**)
2023 **Research in Nursing & Health Best Paper,** [link to Article]
2023 **Fulbright U.S. Scholar,** international fellowship awarded for the project "AI-Enabled ECG Screening of Subclinical Coronary Artery Disease Among Refugees in Jordan"
2024 **Research Article of the Year Award,** AHA, (Published in *Nature Medicine* **[link]**)

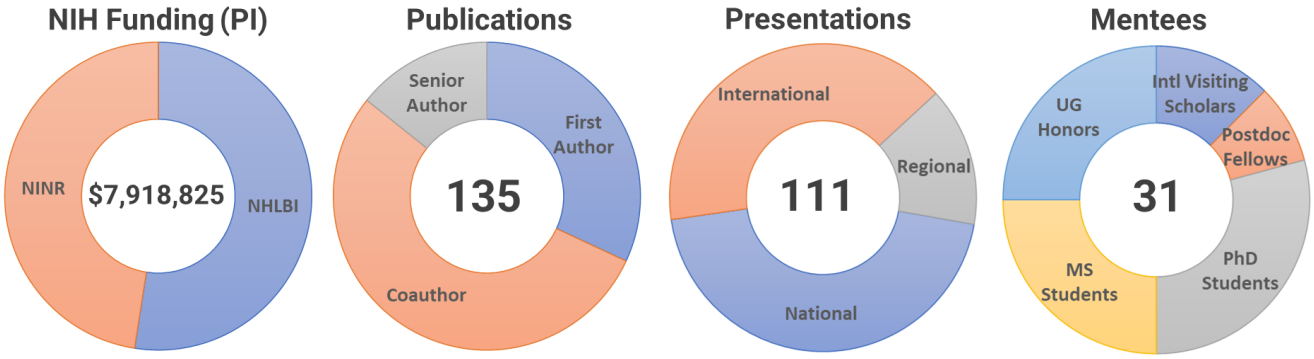
News, Highlights, Editorials, & Expert Opinion

2015 **Editorial Spotlight:** featured in an editorial written by Dr. Robert Lux, PhD "NSTEMI: A Novel and Robust Approach for Early Detection of Patients at Risk", **[Link]**
2020 **Pittwire (University of Pittsburgh News Outlet):** "*New AI Research Looks to Better Diagnose Heart Attacks Before Hospital Arrival"* **[link]**
2021 **tctMD Press:** invited to give expert opinion on "*AI-Enhanced ECG Shows Potential for COVID-19 Screening"* **[Link]**
2022 **Mayo Clinic Podcast "ECG: Making Waves": "***ECG methods for ischemia detection: Recommendations & Future Opportunities"* **[link]**
2023 **Nature Research Briefing:** invited to give expert opinion on *"Improving the diagnosis of myocardial infarction with machine learning"* **[link]**
2023 **UPMC Press Release:** "New AI Tool Beats Standard Approaches for Detecting Heart Attacks" [link]
2023 **WTAE Pittsburgh Channel 4 News:** *"University of Pittsburgh researchers and UPMC are studying AI to detect heart attacks faster"* [link]

Patents

2020 **U.S. Patent:** Patent # 10,820,822 for "ECG identification of non-STE ischemic events" US Patenting and Trademark Office **[link]**
2023 **US Patent:** Patent # 11,883,180 (continuation for # 10,820,822) titled "machine learning-based ECG identification of non-STE ischemia", US Patenting and Trademark Office [link]

RESEARCH



Ongoing Research Projects

NIH/NHLBI — **Al-Zaiti** (PI) — 7/1/22–6/30/26
2R01HL137761-5 — *Impact score = 18 (1st percentile)* — $2,676,069
ECG Detection of Non-ST Elevation Myocardial Events – Two (ECG-SMART-2)
This is a multi-site clinical trial between UPITT and UNC-Chapel Hill to design and deploy a machine-learning-based graphical user interface for real-time identification of coronary events.

NIH/NINR — **Al-Zaiti** (PI) & Clermont (Co-PI) — 2/23/22–11/30/25
2R01NR013912-8 — *Impact score = 24 (7th percentile)* — $3,105,315
Predicting Patients Instability Noninvasively for Nursing Care –Three (PPINNC-3)
This is a multi-site clinical trial to design and pilot test an intelligent alerting system at stepdown and telemetry units. Collaboration sites are Carnegie Mellon University (CMU), UCSF, and UCLA.

NIH/NHLBI — Pelter (PI) — 12/1/23–11/30/27
1R01HL167975 — **Al-Zaiti** (Site PI) — $3,216,140
Evaluation of a novel ECG algorithm to identify and predict VT and in-hospital cardiac arrest
This study aims to create the largest, multi-expert, ground-truth labeled repository of ventricular tachycardia (VT) alarms in ICU patients (n = 25,298) for FDA use prior to 510(k) clearances.

ZOLL Foundation — Karina Kraevsky-Phillips (PI) — 7/1/23–6/30/25
F31 NR018589 — **Al-Zaiti** (Sponsor, Co-PI) — $49,470
Data-driven Modeling of Pathological Mechanisms of Dyspnea in Heart Failure
This mentored research project aims to develop a data-driven triage tool that can aid in risk stratifying HF patient evaluated for dyspnea at the Emergency Department.

University of Pittsburgh — Elmer, Empey, **Al-Zaiti** & Wang (MPI) — 7/1/23–6/30/25
CTSI Health Sciences Team Grant — $150,000
Pittsburgh Resource for EEG & Data Science to Inform Precision Care & Outcomes (PREDICT)
This team science grant aims to fund six preliminary pilot projects in preparation for a P01 Grants focusing on the use of EEG, ECG, ABP, and Pleth to predict neurologic recovery after cardiac arrest.

Ongoing Training Projects

NIH/NINR — Dabbs (PI) & **Al-Zaiti** (Co-PI) — 7/1/22–6/30/27
T32 NR008857 — *Impact score = 23* — $1,551,425
Technology Research in Chronic and Critical Illness (Years 15-20)
This grant provides rigorous research training and interdisciplinary culturalization to aid nurse scientists in adopting technology to promote health, manage illness, and reduce disability.

NIH/NHLBI | Kahn (PI) | 7/1/22–6/30/26
T32 NR008857 | **Al-Zaiti** (Core Training Faculty) | $1,554,715
Multidisciplinary Training in Critical Care Outcomes Research
This training program will provide post-doctoral scholars with state-of-the-art, interdisciplinary training in critical care outcomes research spanning T2, T3, and T4 translation.

NIH/NHLBI | Villanueva FS (PI) | 7/1/23–6/30/26
T32 HL129964 | **Al-Zaiti** (Core Training Faculty) | $2,058,077
Training Program in Imaging Sciences in Translational Cardiovascular Research
This Program aims to train post-doctoral fellows to acquire core competency in imaging technologies and to use these tools to pursue hypothesis-driven cardiovascular research.

Completed Projects

NIH/NINR | Helman (PI) | 7/1/21–12/31/23
F31 NR018589 | **Al-Zaiti** (Sponsor) | $203,877
Use of Predictive Analytics to Quantify Neonatal Hypothermia Burden After Cardiac Surgery
This mentored research project aims to evaluate temporal trends of unintentional hypothermia burden (temperature depth and duration) in neonates after cardiopulmonary bypass surgery.

NIH/NHLBI | **Al-Zaiti** (PI) | 4/15/18–6/30/22
1R01HL137761-1 | *Impact score = 20 (3rd percentile)* | $1,479,372
ECG Detection of Non-ST Elevation Myocardial Events (ECG-SMART)
This prospective cohort study aims to develop machine-learning-based ECG analysis tools to allow real-time identification of acute coronary syndrome in the prehospital setting.

NIH/NINR | **Al-Zaiti** (PI) & Pinsky (Co-PI) | 9/27/16–6/30/22
R01 NR 013912-7 | | $658,069
Predicting Patients Instability Noninvasively for Nursing Care –Two (PPINNC-2)
This prospective cohort study aims to develop an intelligent alerting system based on multi-channel vital signs physiological data to alert nurses to ongoing (and future) hemodynamic instability.

NIH/NINR | Koleck (PI) | 6/1/18–5/30/23
K99/R00 NR017651 | **Al-Zaiti** (Clinical Advisory Panel) | $912,612
Advancing Chronic Condition Symptom Cluster Science Through Use of HER and Data Science
This mentored research project aims to develop a data-driven pipeline for the characterization of symptom clusters from EHRs using a cohort of adult patients diagnosed with chronic comorbidities.

University of Pittsburgh | **Al-Zaiti** (PI) | 9/1/20 – 4/30/22
Ruth Perkins Kuehn Award | | $30,000
Vessel-Specific ECG Leads (VSEL): A Novel Solution for Myocardial Ischemia Detection
This sub-study aims to evaluate the clinical utility of three novel ECG leads that are optimized for detecting ischemia caused by the occlusion of each of the three main coronary arteries.

NIH/NINR | Hravnak & Pinsky (Co-PI's) | 9/27/16–6/30/22
R01 NR 013912 | **Al-Zaiti** (Co-I) | $2,659,686
Predicting Patients Instability Noninvasively for Nursing Care –Two (PPINNC-2)
This prospective cohort study aims to develop an intelligent alerting system based on multi-channel vital signs physiological data to alert nurses to ongoing (and future) hemodynamic instability.

NIH/NINR Frisch (PI) 7/1/19–12/31/21
F31 NR 018589 **Al-Zaiti** (Sponsor) $112,831
Modernizing Emergency Department Nurse Triage via Big Data Analytics
This retrospective cohort study aimed to develop a machine-learning decision support system to triage patients presenting to the emergency department using data available at initial triage.

Oracle for Research **Al-Zaiti** (PI) 9/1/20 – 8/31/22
Cloud Credit Award $50,000
A Deep–Learning Based Clinical Decision Support Tool for Detecting Acute Coronary Lesions
This sub-study aims to develop a deep-learning-based ECG interpretation system that is fully interpretable and can visually display ACS prediction in clinical practice.

University of Pittsburgh **Al-Zaiti** (PI) 7/1/2016–6/30/2019
Momentum Fund $16,000
Non-ST Elevation Myocardial Ischemia: The Role of Cell Survival Genes
This sub-study examined the molecular genetic basis of apoptosis, autophagy, and ischemic preconditioning during the evolution of acute ischemic in STEMI versus NSTEMI patients.

NIH/NCATS Reis (PI) 2/1/2017–9/30/2017
UL 1TROO1857-01 **Al-Zaiti** (sub-award # 0050952) $25,000
Modeling Repolarization Lability on ECG Signals to Detect Myocardial Injury in Chest Pain
This pilot study aimed to develop a tool to analyze beat-to-beat repolarization lability from the standard 12-lead ECG and test its clinical value in detecting myocardial ischemia in chest pain.

University of Pittsburgh **Al-Zaiti** (PI) 7/1/2014–6/30/2016
Momentum Fund $15,000
Redefining the Pretest Probability of Ischemia Prior to Nuclear Stress Testing
This study aimed to validate the diagnostic accuracy of spatial ECG metrics and their dynamic changes against SPECT scans as a gold standard of subclinical myocardial ischemia in chest pain.

UPMC **Al-Zaiti** (PI) 7/1/2015–12/31/2016
Medical Research Fund $24,000
ECG Methods for Prehospital Detection of NSTEMI: Feasibility Study
This pilot study aimed to establish the feasibility of collecting high-quality, reliable, prehospital 12-lead ECGs from our local UPMC Prehospital Network and Pittsburgh EMS agencies.

Emergency Nurses Foundation **Al-Zaiti** (PI) 1/1/2015–12/31/2015
Technology Research Award $6,000
Redefining ECG Interpretation in Emergency Departments: Novel Methods for ACS Detection
This pilot study aimed to test the feasibility of performing real-time advanced analyses of 12-lead ECG signals in the field to harvest novel signatures of ischemia that can be used during patient care.

University of Pittsburgh **Al-Zaiti** (PI) 7/1/2014–12/31/2015
Center for Medical Innovation $12,000
Stratifying Prehospital ECGs for Treatment Decisions at Emergency Departments (SPEED)
This pilot study developed the necessary infrastructure for the acquisition, transmission, and signal processing of prehospital ECG data from Pittsburgh EMS network.

PUBLICATIONS

ORCID: 0000-0002-6862-0658, citations = 1,908, h-index = 20, i10-index = 41

Scientific Statements & Guidelines

2024 **1.** Armoundas A, Narayan S, Lett E, Spector-Bagdady K, Friedman P, Kwitek A, Gollob M, Celi L, Arnett D, Menon B, Bennett D, & **Al-Zaiti SS**. Use of Artificial Intelligence in Improving Outcomes in Heart Disease: A Scientific Statement from the American Heart Association. *Circulation*, doi.org/10.1161/CIR.0000000000001201

2022 **2.** **Al-Zaiti SS**, Alghwiri A, Hu X, Clermont G, Peace A, et al. A Clinician's Guide to Understanding and Critically Appraising Machine Learning Studies: A Checklist for Ruling Out Bias Using Standard Tools in Machine Learning (ROBUST-ML). *European Heart Journal Digital Health*, 2022; Vol 3(2):125-40.

2020 **3.** Franklin BA, Thompson PD, **Al-Zaiti SS**, Albert CM, Hivert M-F, Levine BD, Lobelo F, Madan K, Sharrief AZ, and Eijsvogels TMH. Exercise-related acute cardiovascular events and potential deleterious adaptations following long-term exercise training: placing the risks into perspective–an update: a scientific statement from the American Heart Association. *Circulation*. 2020;141(13): e705–e736.

Original Research (Data-Based)

2024 **4.** Bouzid Z, Sejdic E, Martin-Gill C, Faramand Z, Frisch S, Alrawashdeh M, Helman S, Gokhale T, Riek N, Gregg R, Sereika S, Clermont G, Akcakaya M, Zegre-Hemsey J, Saba S, Callaway C, & **Al-Zaiti SS**. Machine Learning with Electrocardiograms to Optimize All-Cause Mortality Risk Stratification in Patients with Suspected Acute Coronary Syndrome. *European Heart Journal, in press*.

5. Helman S, Sereika S, Hravnak M, Henker R, Gaynor W, Herrup E, Olsen R, Kochanek P, Ghassemzadeh R, Baust T, Riek N, Domnina Y, Lisanti A, and **Al-Zaiti SS**. Association Between Persistent Hypothermia After Cardiopulmonary Bypass in Neonates and Odds of Serious Complications. *Critical Care Explorations*, Vol. 6(8), e1137.

6. Riek N, Gokhale T, Martin-Gill C, Kraevsky-Philips K, Zègre-Hemsey J, Saba S, Callaway C, Akcakaya M, and **Al-Zaiti SS**. Clinical Usability of Deep Learning-Based Saliency Maps for Occlusion Myocardial Infarction Identification from the Prehospital 12-Lead Electrocardiogram. *Journal of Electrocardiology, in press*.

2023 **7.** **Al-Zaiti SS**, Martin-Gill C, Zègre-Hemsey J, et al. Machine Learning for ECG Diagnosis and Risk Stratification of Occlusion Myocardial Infarction. *Nature Medicine*, 2023; Vol. 29(7): 1804-1813.

8. **Al-Zaiti SS** & Bond RR. Explainable-by-design: Challenges, pitfalls, and opportunities for the clinical adoption of AI-enabled ECG. *Journal of Electrocardiology*. Vol (81):292-294.

9. Rooney SR., Kaufman R., Murugan R., Kashani KB., Pinsky MR., **Al-Zaiti SS**, Dubrawski A., Clermont G. and Miller JK. Forecasting imminent atrial fibrillation in long-term electrocardiogram recordings. *J of Electrocardiology*, 81, pp.111-116.

10. Prasad PA, Isaksen JL, Abe-Jones Y, Zègre-Hemsey JK, Sommargren CE, **Al-Zaiti SS** & Pelter MM. Ventricular tachycardia and in-hospital mortality in the intensive care unit. *Heart Rhythm O2*, Vol. 4 (11):715-722.

11. Helman S, Terry MA, Pellathy T, Hravnak M, George E, **Al-Zaiti SS**, Clermont G. Engaging Multidisciplinary Clinical Users in the Design of an Artificial Intelligence–Powered Graphical User Interface for Intensive Care Unit Instability Decision Support. *Applied Clinical Informatics*. 2023;14(04):789-802.

12. Kraevsky-Phillips K, Sereika SM, Bouzid Z, Hickey G, Callaway CW, Saba S, Martin-Gill C, & **Al-Zaiti SS.** Unsupervised machine learning identifies symptoms of indigestion as a predictor of acute decompensation and adverse cardiac events in patients with heart failure presenting to the ED. *Heart & Lung*, Vol. 61(5):107-113.

13. Xiao R, Ding C, Hu X, Clifford G, Wright D, Shah A, **Al-Zaiti SS**, Zegre-Hemsey J. Integrating Multimodal Information in Machine Learning for Classifying Acute Myocardial Infarction. *Physiological Measurement*, 44(4):044002.

14. Pelter MM, Carey MG, **Al-Zaiti SS**, Zegre-Hemsey J, Sommargren C, Isola L, Mortara D, and Badilini F. An annotated ventricular tachycardia (VT) alarm database: Toward a uniform standard for optimizing automated VT identification in hospitalized patients. *Annals of Noninvasive Electrocardiology*, 00, e13054.

15. Bouzid Z, Faramand Z, Martin-Gill C, Sereika S, Callaway C, Saba S, Gregg R, Badilini F, Sejdić E, & **Al-Zaiti SS**. Incorporation of Serial 12-Lead ECG with Machine Learning to Augment the Prehospital Diagnosis of Non-ST Elevation Acute Coronary Syndrome. *Annals of Emergency Medicine*, Vol. 81(1):57-69

2022 **16. Al-Zaiti SS.**, Macleod, M. R., Van Dam, P. M., Smith, S. W., & Birnbaum, Y. Emerging ECG Methods for Acute Coronary Syndrome Detection: Recommendations & Future Opportunities. *J of Electrocardiology*, Vol. 74:65-72.

17. Peace A, **Al-Zaiti SS**, Dewar F, McGilligan V, Bond R. Exploring decision making 'noise' when interpreting the electrocardiogram in the context of cardiac CATH lab activation. *J of Electrocardiology*, Vol. 73:157-161.

18. Bouzid Z, **Al-Zaiti SS**, Bond R, & Sejdić E. Remote and Wearable ECG Devices with Diagnostic Abilities in Adults: A State-of-the-Science Scoping Review. *Heart Rhythm*, Vol. 19(7):1192-1201.

19. Faramand Z, Alrawashdeh M., Helman S, Martin-Gill C, Callaway C, & **Al-Zaiti SS**. Your Neighborhood Matters: A Machine-Learning Approach to the Geospatial and Social Determinants of Health in 9-1-1 Activated Chest Pain. *Research in Nursing and Health*, Vol. 45(2):230-239.

20. Helman, S., Terry, M.A., Pellathy, T., Williams, A., Dubrawski, A., Clermont, G., Pinsky, M.R., **Al-Zaiti, SS**. & Hravnak, M. Engaging Clinicians Early During the Development of a Graphical User Display of An Intelligent Alerting System at the Bedside. *International Journal of Medical Informatics*, Vol. 159:104643.

21. Schwimer, D., **Al-Zaiti, SS**., & Beach, M. (2022). Improving Corrected QT Interval Monitoring in Critical Care Units: A Single Center Report. *Critical Care Nurse*, 42(1), 33-43.

2021

22. Bouzid Z, Faramand Z, Gregg R, Helman S, Martin-Gill C, Saba S, Callaway C, Sejdić E, & **Al-Zaiti SS**. Novel ECG Features and Machine Learning to Optimize Culprit Lesion Detection in Patients with Suspected Acute Coronary Syndrome. *Journal of the Electrocardiology*, Vol. 69:31-37.

23. Helman, S., Herrup, E., Christopher, A., & **Al-Zaiti, SS**. (2021). The role of machine learning applications in diagnosing and assessing critical and non-critical CHD: A scoping review. *Cardiology in the Young*, 31(11), 1770-1780.

24. Faramand Z, Helman S, Ahmad A, Martin-Gill C, Saba S, Callaway C, Gregg R, Wang J, & **Al-Zaiti SS**. Performance and Limitations of Automated ECG Interpretation Statements in Patients with Suspected Acute Coronary Syndrome. *Journal of the Electrocardiology*, Vol. 69:45-50.

25. Finlay D, Bond R, Jennings M, McCausland C, Guldenring D, Kennedy A, Biglarbeigi P, **Al-Zaiti SS**, McLaughlin J. Overview of featurization techniques used in traditional versus emerging deep learning-based algorithms for automated interpretation of the 12-Lead ECG. *Journal of the Electrocardiology*, Vol. 69:7-11.

26. Bond R, Finlay D, **Al-Zaiti SS**, Macfarlane P. Machine learning with ECGs: A call for guidelines and best practices for 'stress testing' algorithms. *Journal of the Electrocardiology*, Vol. 69:1-6.

27. Faramand Z., Martin-Gill C; Callaway CW; & **Al-Zaiti SS**. Modified HEART score to optimize risk stratification in cocaine-associated chest pain. *Am J of Emergency Medicine*, Vol. 47:307-308.

28. Bouzid Z, Faramand Z, Frisch S, Martin-Gill C, Gregg R, Saba S, Callaway C, Sejdić E, & **Al-Zaiti SS**. In Search of Optimal Subset of ECG Features to Augment the Diagnosis of Acute Coronary Syndrome at the Emergency Department. *Journal of the American Heart Association (JAHA)*, Vol. 10(3): e017871.

29. Faramand Z., Hongjin Li; Al-Rifai N, Frisch SO; Abu-Jaradeh O, Mahmoud A, & **Al-Zaiti SS**. Association between history of cancer and major adverse cardiovascular events in patients with chest pain presenting to the emergency department: a secondary analysis of a prospective cohort study. *European Journal of Emergency Medicine*, Vol. 28(1):64-69.

30. Faramand Z., Martin-Gill C; Frisch S; Callaway CW; & **Al-Zaiti SS**. The Prognostic Value of HEART score in Patients with Cocaine Associated Chest Pain: An Age-and-Sex Matched Cohort Study. *Am J of Emerg Med*, Vol. 45:303-308.

2020

31. Frisch SO; Faramand Z., Leverknight B.; Martin-Gill C., Sereika S., Sejdic E., Callaway C., & **Al-Zaiti SS**. The Association Between Patient Outcomes and the Initial Emergency Severity Index Triage Score in Patients with Suspected Acute Coronary Syndrome. *Journal of Cardiovascular Nursing;* Vol. 35(6):550-557.

32. Khraim F; Alhamaydeh M; Faramand Z; Saba S; **Al-Zaiti SS**. A Novel Non-invasive Assessment of Cardiac Hemodynamics in Patients with Heart Failure and Atrial Fibrillation. *Cardiology Research*, Vol. 11(6):370-375.

33. **Al-Zaiti SS,** Besomi L, Bouzid Z, Faramand Z, Frisch S, Martin-Gill C, Gregg R, Saba S, Callaway C, & Sejdić E. Machine Learning-Based Prediction of Acute Coronary Syndrome Using Only the Pre-Hospital 12-Lead Electrocardiogram. *Nature Communications*, Vol. 11: 3966 (doi.org/10.1038/s41467-020-17804-2)

34. Frisch SO; Brown J; Faramand Z., Stemler J, Sejdic E, Martin-Gill C., Callaway CW; Sereika S.; & **Al-Zaiti SS**. Exploring the Complex Interactions of Baseline Patient Factors to Improve Nursing Triage of Acute Coronary Syndrome. *Research in Nursing and Health*, Vol. 43: *356–364* (doi.org/10.1002/nur.22045)

35. Alhamaydeh M, Gregg R, Ahmad A, Faramand Z, Saba S, and **Al-Zaiti SS**. Identifying the most important ECG predictors of reduced ejection fraction in patients with suspected acute coronary syndrome. *Journal of Electrocardiology*, Vol. 61 (4): *81–85*.

2019 **36.** Frisch SO; Faramand Z., Abu-Jaradeh O.; Martin-Gill C., Callaway C., & **Al-Zaiti SS**. Prevalence and Predictors of Delay in Seeking Emergency Care in Patients Who Call 9-1-1 for Chest Pain. *Journal of Emergency Medicine*, Vol. 57(5):603-610.

37. Faramand Z., Frisch SO; Al-Robaidi K., Alrawashdeh M., Alhamaydeh M., Callaway C., Martin-Gill C., & **Al-Zaiti SS**. The Diurnal, Weekly, and Seasonal Variations of Chest Pain in Patients Transported by Emergency Medical Services. *Emergency Medicine Journal*, 36(10):601-607.

38. **Al-Zaiti SS**, Pietrasik G., Carey MG, Alhamaydeh M., Canty JM & Fallavollita JA. The Role of Heart Rate Variability, Heart Rate Turbulence, and Deceleration Capacity in Predicting Cause-Specific Mortality in Chronic Heart Failure. *Journal of Electrocardiology*. Vol. 52(1):70-74.

39. Faramand Z., Frisch SO; DeSantis A., Alrawashdeh M., Martin-Gill C., Callaway C., **Al-Zaiti SS**. Lack of Significant Coronary History and ECG Misinterpretation Are the Strongest Predictors of Undertriage in Prehospital Chest Pain. *Journal of Emergency Nursing*, Vol. 45(2):161-168.

40. Rivero D., Alhamaydeh M., Faramand Z., Martin-Gill C., Callaway C., Drew B., and **Al-Zaiti SS**. Nonspecific Electrocardiographic Abnormalities Are Associated with Increased Length of Stay and Adverse Cardiac Outcomes in Prehospital Chest Pain. *Heart & Lung: Journal of Acute and Critical Care*, Vol. 48(2):121-125.

41. **Al-Zaiti SS**, Faramand Z., Alrawashdeh M., Sereika S., Martin-Gill C., Callaway C. Comparison of Clinical Risk Scores for Triaging High-Risk Chest Pain Patients at the Emergency Department. *American J of Emergency Medicine*, Vol 37(3):461-67.

2018 **42.** **Al-Zaiti SS**, Sejdic E, Nemec J, Callaway C, Soman P, Lux R. Spatial Indices of Repolarization Correlate with Non-ST Elevation Myocardial Ischemia in Patients with Chest Pain. *Medical & Biological Engineering & Computing*, 56(1):1-12.

2017 **43.** **Al-Zaiti SS**, Alrawashdeh, M., Martin-Gill, C., Callaway, C., Mortara, D., & Nemec, J. Evaluation of Beat-to-Beat Ventricular Repolarization Lability from Standard 12-Lead ECG during Acute Myocardial Ischemia. *Journal of Electrocardiology*, 50(6):717-724

44. **Al-Zaiti SS**, Saba, S., Pike, R., Williams, J., & Khraim, F. Arterial Stiffness is Associated with QTc Interval Prolongation in Patients with Heart Failure. *Biological Research for Nursing*, 20(3):255-263.

2016 **45.** **Al-Zaiti, S. S.**, & Magdic, K. S. Paroxysmal Supraventricular Tachycardia: Pathophysiology, Diagnosis, and Management. *Critical Care Nursing Clinics of North America*, 28(3), 309-316.

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INTERNATIONAL PRESENTATIONS

***** indicates podium***

International Society of Computerized ECG (ISCE)

2024 **1.** ** Riek N, Bouzid Z, Gokhale T, Van Dam P, Kraevsky-Philips K, Helman S, Martin-Gill C, Callaway C, Saba S, Sejdic E, Zegre-Hemsey J, Akcakaya M, & **Al-Zaiti SS**. Saliency Maps to Enhance Explainability of Occlusion Myocardial Infarction Classification Among Pre-Hospital Chest Pain Patients. *Journal of Electrocardiology*; Vol. (84): 12-13.

2. Zegre-Hemsey J, Gregg R, **Al-Zaiti SS**. Characteristics of ST-Segment Elevation and ST-Depression Changes in Serial Prehospital Electrocardiograms Among Individuals Transported by Ambulance for Suspected Acute Coronary Syndrome. *Journal of Electrocardiology*; Vol. (84): 19.

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5. ** Rooney S, Kaufman R, **Al-Zaiti SS**, Dubrawski A, Clermont G, Miller K. Forecasting imminent atrial fibrillation in long-term ECG recordings. *Journal of Electrocardiology*; Vol (78):11-12

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11. **** Al-Zaiti SS**, Saba S, Peace A, Macleod R, and Bond R. Emerging ECG Methods for Ischemia Detection: Recommendations & Future Opportunities. *Journal of the Electrocardiology*

2021 **12.** ** Faramand Z, Helman S, Ahmad A, Martin-Gill C, Saba S, Callaway C, Gregg R, Wang J, & **Al-Zaiti SS**. Performance and Limitations of Automated ECG Interpretation Statements in Patients with Symptomatic Coronary Artery Disease. *Journal of the Electrocardiology*, Vol 69:45.

13. ** Bouzid Z, Faramand Z, Gregg R, Helman S, Martin-Gill C, Saba S, Callaway C, Sejdić E, & **Al-Zaiti SS**. Novel ECG Features and Machine Learning to Optimize Culprit Lesion Detection in Patients with Suspected Acute Coronary Syndrome. *Journal of the Electrocardiology*, Vol. 69:31.

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Computing in Cardiology (CinC)

2023 **32.** Gregg RE, An J, Bailey B, & **Al-Zaiti SS**. An Efficient Linear Phase High-Pass Filter for ECG. Computing in Cardiology; Vol. 50, pp. 1-4, IEEE.

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Heart Rhythm Society (HRS)

2023 **34.** Gokhale T, Bouzid Z, Riek, N, Van Dam P, **Al-Zaiti, SS**, & Saba S**.** Direction of Repolarization in baseline ECG are predictive of response to cardiac resynchronization therapy. *Heart Rhythm*; 20(5): S360-361.

European Society of Intensive Care Medicine (ESICM)

2022 **35.** Rooney S, Kaufman R, Goswami M, Miller K, **Al-Zaiti SS**, Dubrawski A, & Clermont G. Detecting Atrial Fibrillation on Unlabeled, Continuously Streamed Data Using Weak Supervision.

2021 **36.** Helman S, Terr T, Pellathy T, Williams A, Dubrawski A, Clermont G, Pinsky M, **Al-Zaiti SS**, & Hravnak M. A User Engaged Iterative Design for the Graphical Interactive Display of Machine Learning-Based Intelligent Alerting Systems.

37. Welter G, Dubrawski A, Pellathy T, Helman S, Lagattuta T, Hravnak M, Pinsky M, Clermong G, & **Al-Zaiti SS**. High-Frequency Sampling and Signal Quality Indices Boost the Performance of Online Classification of Real Alerts versus Artifacts in Multi-Signal Vital Signs Monitoring Data.

The Canadian Congress of Cardiology (CCC)

2018 **38. ** Al-Zaiti, SS**., Faramand, Z., Martin-Gill, C., & Callaway, C. Demographic and Clinical Predictors of ACS in Patients with Prehospital Chest Pain and Benign ECG Findings. *Canadian Journal of Cardiology*, 34(10): S201-S202.

2015 **39. ** Al-Zaiti SS**, Pike, R., Williams, J., & Khraim, F. The Clinical Significance of Fragmented QRS and Widened QRS-T Angle in Systolic Dysfunction: Novel Insights Using Impedance Cardiography. *Canadian Journal of Cardiology*, 31(10): S315

The International Nursing Research Congress

2019 **40.** Frisch, S. O., Faramand, Z., Martin-Gill, C., Callaway, C., & **Al-Zaiti, SS.** Patient Factors at Emergency Department Nurse Triage Predictive of ACS.

NATIONAL PRESENTATIONS

***** indicates podium***

American Heart Association (AHA) Scientific Sessions

2024 **41.** ** Bani Hani, D.A., Alshraideh, J.A., Alduraidi, H., **Al-Zaiti SS**. Novel Systemic Inflammatory Biomarkers Can Predict Significant Coronary Disease in High-Risk Patients. *Circulation*; 150(Suppl_1): *in press*

42. ** Kraevsky-Phillips, K., Scott, P., Thangavel, S., **Al-Zaiti SS**. Most Important Predictors of 30-Day Death in Patients with Heart Failure Presenting with Acute Dyspnea. *Circulation*; 150(Suppl_1): *in press*

43. Atoum H, Qi Ji R., Abu-Hannaneh M, Alduraidi H, Alsharaideh J, Sejdic E, and **Al-Zaiti SS**. Feasibility of Using Wearables to Obtain High-Fidelity ECG Signals for Cardiovascular Disease Screening in Palestinian Refugees in Jordan. *Circulation*; 150(Suppl_1): *in press*

44. ** Kraevsky-Phillips, K., Ji, R.Q., Thangavel, S., **Al-Zaiti SS**. Machine learning identifies predictors of poor outcomes in patients with heart failure presenting to the emergency department for chest pain. *Circulation*; 150(Suppl_1): *in press*

45. ** Helman S, Riek N, Sereika S, Gaynor W, Olsen R, Lisanti A, **Al-Zaiti SS**. Exploring Novel Data-Driven Clustering Methods for Uncovering Patterns in Longitudinal Neonatal Postoperative Temperature Measurements. *Circulation*; 150(Suppl_1): *in press*

2023 **46.** Kraevsky-Phillips K, Callaway CW, Henker RA, Scott P, **Al-Zaiti SS**. Black Patients with Heart Failure Living in Distressed Communities Disproportionately Experience Excess Risk of Mortality After Emergency Department Visit for Dyspnea. *Circulation*; 148(Suppl_1):A17315.

47. Prasad PA, Zegre-Hemsey JK, Carey M, **Al-Zaiti SS**, Sommargren CE, Isola L, Mortara D, Badilini F, Pelter MM. Comparison of the Frequency and Time to True Ventricular Tachycardia Among Patients in the Cardiac, Medical/Surgical and Neurologic Intensive Care Units. *Circulation*; 148(Suppl_1):A13943.

2022 **48.** Bouzid Z, Faramand Z, **Al-Zaiti SS**, & Sejdic E. Evaluating sex-disparities in machine learning decision support tools for acute coronary syndrome classification in the emergency department. *Circulation*, 146(S1): A15435.

49. Rooney S, Kaufman R, Goswami M, Miller K, **Al-Zaiti SS**, Pinsky M, Dubrawski A, & Clermont G. Using Weakly Supervised Machine Learning to Label AFIB in Real-World Intensive Care Unit Telemetry Data. *Circulation*, 146(S1): A10198.

50. Ahmad A, Daoud M, Faramand Z, **Al-Zaiti SS**. Increased T Wave Amplitude In Lead aVR is a Strong Predictor of Reduced Left Ventricular Ejection Fraction In Suspected Acute Coronary Syndrome. *Circulation*, 146(S1): A15858

51. Zègre-Hemsey J, Crandell J, Wong E, Chronowski K, Tolentino A, Ronn K, Steege N, Frisch S, **Al-Zaiti SS**, Rosamond W, Dickson V, Pelter M, & DeVon H. Stable versus Dynamic Cardiac Symptom Characteristics are Associated with Adverse Outcomes Among Individuals Transported by Ambulance for Suspected Acute Coronary Syndrome. *Circulation*, 146(S1): A10852.

2021 **52.** ** Kraevsky-Phillips K, Bouzid Z, Ahmad A, Faramand Z, & **Al-Zaiti SS**. An Unsupervised Machine-Learning-Based Approach Elucidates the Prognostic Value of Symptom Clusters in Heart Failure Patients Evaluated in the Emergency Department. *Circulation*, 144(Suppl_1): A12673

53. Ahmad A., Faramand Z, Mahmoud A, Gregg R, & **Al-Zaiti SS**. Fragmented QRS with Benign Early Repolarization Pattern is a Strong Predictor of Adverse Events in Patients with Suspected Acute Coronary Syndrome. *Circulation*, 144: A12595

54. Bouzid Z., Faramand Z, Frisch S, Gregg R, Sejdic E, & **Al-Zaiti SS**. ECG-Based Risk Stratification of Long-Term Mortality in Suspected Acute Coronary Syndrome. *Circulation*, 144(Suppl_1), A12636.

55. Helman S., Herrup E, Christopher A, & **Al-Zaiti SS**. The Role of Machine Learning-Based Decision Support Tools for Diagnosing and Assessing Congenital Heart Disease. *Circulation*, 144(Suppl_1), A12262.

2020 **56.** Ahmad, A., Alhamaydeh, M., Faramand, Z., Gregg, R., Saba, S., & **Al-Zaiti SS**. (2020). Identifying the Most Important ECG Predictors of Reduced Ejection Fraction in Patients With Suspected Acute Coronary Syndrome. *Circulation*, 142(Suppl_3), A13596-A13596.

2019 **57. ** Al-Zaiti SS;** Abu-Jaradeh O; Faramand Z; Al-Ghouleh I; Conley Y. Effect of Ischemic Preconditioning on Apoptosis and Autophagy: A Potential Key Role in ST-Elevation vs. Non-ST Elevation Acute MI. *Circulation*, 140:A16285

58. ** Frisch S; Hongjin L; Faramand Z; Callaway C; Martin-Gill C; Sejdic E; **Al-Zaiti SS**. Using Predictive Machine Learning Modeling for the Nursing Triage of Acute Chest Pain at the Emergency Department. *Circulation*, 140:A14879

59. Abu-Jaradeh O; Ahmad A; Frisch S; Faramand Z; Landis P; Mahmoud A; Callaway C; Martin-Gill C; **Al-Zaiti SS**. Supplemental Oxygen is Associated With Larger Infarct Size but Not Excess Risk of Adverse Cardiac Events in Non-ST Elevation Myocardial Infarction. *Circulation*, 140:A11501

60. Alhamaydeh M; Ahmad A; Frisch S; Faramand Z; Saba S; Gregg R, Callaway C; Martin-Gill C; **Al-Zaiti SS**. Tpeak–Tend Interval on the Prehospital 12-lead ECG is a Strong Predictor of Adverse Cardiac Events in Patients With Suspected Acute Coronary Syndrome. *Circulation*, 140:A11508

61. Mahmoud A; Hongjin L; Abu-Jaradeh O; Frisch S; Faramand Z; Callaway C; Martin-Gill C; **Al-Zaiti SS**. Is HEART Score Adequate for Triaging Acute Chest Pain in Cancer Survivors? *Circulation*, 140:A14860

2018 **62.** Alhamaydeh, M., Faramand, Z., Martin-Gill, C., Callaway, C., & **Al-Zaiti, SS**. Should Paramedics Withhold Nitroglycerin in Patients With Prehospital Chest Pain Who Are Tachycardiac? *Circulation*, 138:A12389

63. Frisch, S. O., Alrawashdeh, M., Martin-Gill, C., Callaway, C., & **Al-Zaiti, SS**. Geospatial Analysis of Chest Pain Patients That Call 9-1-1 in the City of Pittsburgh. *Circulation*, 138: A16400

2017 **64.** Frisch, S., Martin-Gill, C., Alrawashdeh, M., Callaway, C., & **Al-Zaiti SS**. Incidence and Predictors of Delaying Seeking Emergent Medical Care Among Patients With Suspected Acute Coronary Syndrome. *Circulation*;136:A18707

65. DeSantis, A., Landis, P., Alrawashdeh, M., Martin-Gill, C., Callaway, C., & **Al-Zaiti SS**. Predictors of Emergency Medical Personnel's Decision to Transmit or Not to Transmit the Prehospital 12-Lead ECG of Patients With Suspected Acute Myocardial Infarction. *Circulation*;136:A18641

66. Faramand, Z., Alrawashdeh, M., Martin-Gill, C., Callaway, C., & **Al-Zaiti SS**. Evaluating the Diagnostic Accuracy of Clinical Risk Scores to Detect Acute Coronary Syndrome in Patients Evaluated at the Emergency Department for a Chief Complaint of Chest Pain. *Circulation*; 136:A19451

67. Rivero, D., Alhamaydeh, M., Martin-Gill, C., Callaway, C., Drew, B., & **Al-Zaiti SS**. The Prevalence of Secondary Repolarization Abnormalities Confounding the Electrocardiographic Diagnosis of Acute Myocardial Ischemia in Patients Presenting With Chest Pain. *Circulation*;136:A18750

68. Alhamaydeh, M., Alrawashdeh, M., Martin-Gill, C., Callaway, C., & **Al-Zaiti SS**. Time of Day and Day of Week Variations in Chest Pain Encounters at the Prehospital Setting. *Circulation*;136:A18689

2016 **69.** Alhamaydeh, M., Rivero D., Alrawashdeh, M., Martin-Gill, C., Callaway, C., & **Al-Zaiti SS**. ECG Characteristics of Patients Evaluated at the Emergency Department for a Chief Complaint of Chest Pain. *Circulation*; 134:A15745

2015 **70.** ** **Al-Zaiti SS**, Pike R, Williams J, & Khraim F**.** The Hemodynamic Determinants and Physiologic Correlates of QTc Interval Using Impedance Cardiography in Heart Failure. *Circulation* 132(Suppl 2): A15631

2014 **71.** **Al-Zaiti SS**, Carey MG, Canty MJ, and Fallavollita JA. The Role of Heart Rate Variability in Predicting Sudden and Non-Sudden Cardiac Death in Ischemic Heart Disease. *Circulation* 130(Suppl 2): A14269.

2013 **72.** ** **Al-Zaiti SS**, Carey MG, Canty MJ, and Fallavollita JA. The Prognostic Value of Positive T waves in Lead aVR: A Simple Risk Marker of Sudden and Non-Sudden Cardiac Death in Patients With Ischemic Cardiomyopathy and Poor Left Ventricular Ejection Fraction. *Circulation* 128(22): A17920.

Society of Critical Care Medicine (SCCM)

2025 **73.** Kraevsky-Phillips, K., Aqtash, S., Teh, C.E., Lagattuta, T., Pinsky, M.R., Hravnak, M., Clermont, G, **Al-Zaiti SS**. Types of Audible Patient Monitor Alerts Encountered in a Step-Down Unit. *Critical Care Medicine*, in *press*

74. **Al-Zaiti SS**., Kraevsky-Phillips, K., Aqtash, S., Teh, C.E., Lagattuta, T., Pinsky, M.R., Hravnak, M., Clermont, G. Feasibility of Developing an Alert Burden Index to Assist Nurse-Patient Assignments. *Critical Care Medicine*, in *press*

75. Brown C, Callaway C, Martin-Gill C, Saba S, **Al-Zaiti SS**, Helman S. Association Between Mortality and Acute Myocardial Infarction with and Without ST-Elevation. *Critical Care Medicine*, in *press*

76. **Al-Zaiti SS**., Kraevsky-Phillips, K., Aqtash, S., Vedant S., Teh, C.E., Lagattuta, T., Pinsky, M.R., Hravnak, M., Clermont, G. Evaluating Hypoxemia Burden as a Mortality Predictor in Step-Down Units. *Critical Care Medicine*, in *press*

2024 **77.** ** Hravnak M, Aqtash S, Kraevsky-Phillips K, Lagattuta T, Pinsky M, Clermont G, & **Al-Zaiti SS**. Distribution of Continuous Vital Signs Monitoring Alerts at the Bedside. *Critical Care Medicine*, Vol. 52(1), S590.

2023 **78.** ** Rooney S, Hravnak M, **Al-Zaiti SS**, Clermont G. Racial Differences in Commercial Monitoring Software Detection of Atrial Fibrillation. *Critical Care Medicine*, Vol. 50(1):

2022 **79.** Hravnak M, Clermont G, Helman S, Pellathy T, Lagattuta T, Saul M, George B, Pinsky M, **Al-Zaiti SS**. Medical Emergency Team (MET) Calls for Ward Patients After Down-Transfer From an ICU. *Critical Care Medicine*, Vol. 50(1):617

80. Helman S, Terry M, Hravnak M, Pellathy T, George B, Pinsky M, **Al-Zaiti SS**, Clermont G. User-Engaged Design of a Graphical User Interface for Instability Decision Support in the ICU. *Critical Care Medicine*, Vol. 50(1):269

American College of Cardiology (ACC) Scientific Sessions

2024 **81.** Gokhale T, Riek NT, Bouzid Z, Medoff B, Viqar A, Sejdic E, Akcakaya M, Saba SF, **Al-Zaiti SS**, Toma C. Risk Stratification of Pulmonary Embolism via ECG-Based Machine Learning Model. *Journal of the American College of Cardiology*. Vol. 83(13_Supplement):2315

82. Ahmad A, Faramand Z, Pless A, Abuhannaneh M, Shamoon FE, **Al-Zaiti SS**. Disparities in analgesia administration in a racial diverse population for the management of acute chest pain in the emergency department. *Journal of the American College of Cardiology*. Vol. 83(13_Supplement):1788.

2022 **83.** Ahmad A, Faramand Z, Wang J, Gregg R, Martin-Gill C, Callaway C, Saba S, and **Al-Zaiti SS**. Vessel-Specific ECG Leads as a Novel Strategy for Myocardial Ischemia Detection in Patients with Suspected Acute Coronary Syndrome. *Journal of the American College of Cardiology*, 79(9_Supplement):150

2013 **84.** ** Carey MG, Fallavollita JA, Canty MJ, and **Al-Zaiti SS**. ECG Predictors of Mortality among Implantable Cardioverter-Defibrillator Candidates for the Primary Prevention of Sudden Cardiac Death. *JACC;* 61: E616.

American College of Emergency Physicians (ACEP)

2021 **85.** **Faramand, Z., Ahmad, A., Martin-Gill, C., Callaway, C., & **Al-Zaiti, S**. Two Thirds of Patients with ACS in High-Risk Chest Pain Have a Negative First Conventional Troponin. *Annals of Emergency Medicine*, 78(4), S41.

Emergency Nursing (ENA Annual Conference)

2018 **86.** Faramand, Z., Frisch S., Martin-Gill, C., Callaway, C., & **Al-Zaiti SS**. HEART score: Valid assessment tool for cocaine associated chest pain

87. Frisch S., Faramand, Z., Martin-Gill, C., Callaway, C., & **Al-Zaiti SS.** Resolution of Ischemic ECGs Changes in Prehospital Chest Pain Patients

Eastern Nursing Research Society (ENRS)

2023 **88.** Gallagher M, Helman S, Scott P, **Al-Zaiti SS**. Demographic and Clinical Characteristics of Acute Coronary Syndrome Patients with Single Versus Multi-Vessel Coronary Occlusion.

89. Helman S, Sereika S, Hravnak M, Henker R, Riek N, Herrup E, Lisanti A, Gaynor W, Olsen R, Kennedy A, **Al-Zaiti SS**. An exploratory analysis of neonatal temperature trajectories after open heart surgery.

2019 **90.** ** Landis P.; Faramand Z.; Zegre-Hemsey J.; Frisch S.; Ren D.; Callaway C.; Frisch A.; & **Al-Zaiti SS.** The Prevalence and Outcomes of Morphine Use in the Initial Management of Patients with Acute Myocardial Infarction

2016 **91.** ** Alrawashdeh, M., **Al-Zaiti, S.,** Sejdic, E., Martin-Gill, C., & Callaway, C. Repolarization Dispersion on the Prehospital 12-Lead ECG Predicts Ischemic Myocardial Injury in Chest Pain Patients. *Nursing Research;* 65(2):E94.

Council for the Advancement of Nursing Science (CANS)

2022 **92. Al-Zaiti SS**, Bouzid Z, Faramand Z, Martin-Gill C, Saba S, Akcakaya M, Clermont G, Callaway C, Sejdic E. Evaluating race-disparities in machine learning decision support tools for acute coronary syndrome classification in the ED.

2016 **93.** ** **Al-Zaiti, SS**; Rittenberger J; Reis, S; and Hostler D. The Impact of Exertional Heat Stress on Cardiovascular Responses in Fire Suppression and Recovery.

2010 **94.** ** **Al-Zaiti SS**; Liao L; Martin H; Butler R; and Carey MG. Metabolic Syndrome: Quantified and Reduced in Firefighters

OTHER REGIONAL PRESENTATIONS

***** indicates podium***

Grand Rounds

2024 **95. ** Al-Zaiti SS**. Machine Learning for the ECG Diagnosis and Risk Stratification of Occlusion Myocardial Infarction. *Henry Ford Hospital, Detroit, MI*

96. ** Al-Zaiti SS. Advancing Emergency Cardiovascular Care: The Convergence of Biomedical Informatics and Machine Learning. *SUNY Buffalo, Buffalo, NY*

2023 **97. ** Al-Zaiti SS**. Intelligent Clinical Decision Support to Improve Patient Outcomes: A Decade of Experience. *University of Rochester, Rochester, NY*

98. ** Al-Zaiti SS. Machine Learning for the ECG Diagnosis and Risk Stratification of Occlusion Myocardial Infarction. *Stony Brook University, Stony Brook, NY*

99. ** **Al-Zaiti SS**. Intelligent ECG Methods for Myocardial Ischemia Detection. Senior Vice Chancellor's Research Seminar Series, *University of Pittsburgh, PA*

2022 **100.** **** Al-Zaiti SS**. Machine-learning based clinical decision tools and intelligent alerting systems. *University of Iowa, Iowa City, Iowa*

2019 **101.** **** Al-Zaiti SS**. Frontiers in AI Algorithms: ECG Methods for the Prompt Identification of Coronary Events. *Stanford University, San Francisco, CA*

2018 **102.** **** Al-Zaiti SS**. Establishing a Program of Research in a Research-Intensive Institution: Lesson Learned. *University of Texas at Houston, Houston TX*

2018 **103.** **** Al-Zaiti SS**. Big Data in Cardiology: Machine Learning and the Electrocardiogram. *State University of New York at Buffalo, Buffalo, NY*

AHA Fellows Research Day (Northeast Affiliate)

2023 **104.** Helman S, Sereika S, Hravnak M, Henker R, Riek N, Herrup E, Lisanti A, Gaynor W, Olsen R, Kennedy A, **Al-Zaiti SS**. An exploratory analysis of neonatal temperature trajectories after open heart surgery.

2018 **105.** Faramand, Z., Frisch S., Martin-Gill, C., Callaway, C., & **Al-Zaiti SS.** Evaluating the Diagnostic Accuracy of Clinical Risk Scores to Detect ACS in Patients with Chest Pain.

2016 **106.** ** Alrawashdeh, M., Sejdic, E., Martin-Gill, C., & Callaway, C, **Al-Zaiti, SS**. Repolarization Dispersion on the Prehospital 12-Lead ECG Predicts Ischemic Myocardial Injury in Chest Pain Patients.

McGowan Institute Scientific Retreat

2018 **107.** **** Al-Zaiti SS,** Faramand, Z., Frisch S., Martin-Gill, C., Callaway, C., & Sejdic E. Novel Methodologies and Technologies to Detect and Analyze Physiological Markers of Clinical Interest.

SAFAR Symposium (University of Pittsburgh)

2022 **108.** Kraevsky-Phillips K, Bouzid Z, Ahmad A, Faramand Z, & **Al-Zaiti SS**. An Unsupervised Machine Learning Approach Elucidates the Prognostic Value of Symptom Clusters in Heart Failure Patients Evaluated in the ED.

2021 **109.** Kates L, Faramand Z, **Al-Zaiti SS**. The Prevalence of ECG Findings Encountered by Paramedics During Ambulance Transport

2017 **110.** Faramand, Z., Frisch S., Martin-Gill, C., Callaway, C., & **Al-Zaiti SS.** HEART score: Valid assessment tool for cocaine associated chest pain

Pittsburgh Health Data Alliance (PHDA) Annual Retreat

2017 **111.** ** **Al-Zaiti SS** and Sejdic E. EMPIRE: A smart detection system for rapid diagnosis of heart attacks

MENTORING FOR THESIS & DISSERTATION

International Visiting Scholars

Scholar and Affiliation	*Training Period*	*Project Title*
Abdullah Ahmad Sultan, MD University of Jordan, Jordan	7/2019–6/2020 **Mentor**	"Fragmented QRS with Benign Early Repolarization Pattern As a Strong Predictor of Adverse Events in Patients with Suspected Acute Coronary Syndrome"
Omar Abu-Jaradeh, MD Hashemite University, Jordan	9/2018–6/2019 **Mentor**	"Association between supplemental Oxygen and Infarct Size in Non-ST Elevation Myocardial Infarction"
Mohammad Alhamaydeh, MD University of Jordan, Jordan	1/2017–12/2017 **Mentor**	"Time of Day and Day of Week Variations in Chest Pain Encounters at the Prehospital Setting"

Postdoctoral Research Fellows

Name of Postdoc Fellow & Source of Support	*Training Period & Role*	*Project Title*
Stephanie Helman, RN, PhD UL1TR001857	1/2024–12/2025 **Mentor**	"Improving outcomes in neonates with congenital heart defects after cardiopulmonary bypass surgery"
Ziad Faramand, MD, MS R01HL137761	9/2018–6/2022 **Mentor**	"Comparison of Clinical Risk Score for Detecting Acute Coronary Syndrome at the Emergency Department"
Donald T Smith, PhD, RN, AG-ACNP-BC, FF/EMT-P T32NR008857	9/2014–8/2016 **Co-Mentor**	"Analyzing Safety, Effectiveness, and Outcomes of a 5-Level Triage System in the Prehospital Care Environment"

PhD Dissertation Research

Name of Student, Department, & Source of Support	*Training Period & Committee Role*	*Project Title*
Navpreet Kamboj, RN, PhD(c) *School of Nursing – University of Toronto, Canada*	1/2024–12/2025 **External Examiner**	"Developing a NITROglycerin Dose Titration Decision Support System (NITRO DSS)"
Dania Bani Hani, RN, MSN *School of Nursing – University of Jordan, Jordan*	1/2024–12/2025 **External Examiner**	"Prospective external validation of AI-ECG models for diagnosing occlusion myocardial infarction"

Rui Qi Ji *School of Engineering – University of Toronto, Canada*	9/2023–9/2026 **External Examiner**	"AI-Augmented ECG to screen for subclinical coronary artery disease"
Nathan Riek, BS. *Electrical & Computer Engineering Department* R01HL137761	7/2022–4/2025 **Co-Chair**	"Machine learning methods and approaches to analyze biomedical signals and to optimize clinical decision support in healthcare"
Karina Kraevsky-Phillips, MA, BSN, RN, CCRN *School of Nursing* T32NR008857	9/2021–4/2024 **Chair**	"Data-Driven Phenotyping of Dyspnea in Symptomatic Patients with Heart Failure"
Zeineb Bouzid, BS, MSc., *Electrical & Computer Engineering Department* R01HL137761	9/2020–4/2024 **Co-Chair**	"Unveiling the potential of the 12-lead ECG in predicting ACS: from understanding the diagnostic value of handcrafted features to exploring hidden patterns in the ECG signal"
Stephanie Helman, RN, CNS, *School of Nursing* T32NR008857 F31 NR 018589	9/2019–12/2023 **Chair**	"Use of Predictive Analytics to Quantify Neonatal Hypothermia Burden After Cardiac Surgery"
Stephanie Frisch, RN, CCRN, *School of Nursing* T32NR008857 F31NR018589	9/2017–8/2020 **Chair**	"Triaging chest pain patients in the emergency department: a novel machine learning approach"
Tiffany Pellathy, RN, ACNP *School of Nursing* F31NR018102	9/2018–8/2020 **Member**	"Machine Learning to Determine Dynamically Evolving New-Onset Venous Thromboembolic (VTE) Event Risk in Hospitalized Patients"
Mohammad Alrawashdeh, RN, MSN, *School of Nursing* T32NR008857	9/2015–8/2017 **Member**	"Clinicians' Acceptance of Interactive Health Technologies to Support Patients' Self-Management"

DNP Capstone

Name of Student, Department, & Source of Support	***Training Period & Committee Role***	***Project Title***
Danielle Schwimer, RN, BSN *School of Nursing*	9/2018–8/2019 **Member**	"A Quality Improvement Project to Enhance QTc Interval Monitoring in a Critical Care Setting: Pre and Posttest Study"

Master's Thesis

Name of Student, Department, & Source of Support	***Training Period & Committee Role***	***Project Title***
Mohammad Hamaideh, MD *School of Public Health* *East Carolina University, Greenville, NC, USA*	1/2023–6/2024 **External Examiner**	"Comparative effectiveness of the HEART score in triaging diabetic and non-diabetic patients with Chest Pain"
Shaima'a Shatnawi, RN *School of Nursing – Jordan University of Science & Technology, Irbid, Jordan*	1/2024–6/2024 **External Examiner**	"Intention to use mobile health technologies among healthcare providers in dialysis units in Jordan"
Abdullah Ahmad, MD, MPH *School of Public Health* *Tufts University*	9/2021–6/2023 **External Examiner**	"Disparities in Analgesia Administration in a Racial Diverse Population for the Management of Acute Chest Pain in the Emergency Department"
Zeineb Bouzid, BS, MSc., *Electrical & Computer Engineering Department* R01HL137761	9/2019–8/2020 **Co-Chair**	"Novel Approaches to ECG Feature Selection for Dimensionality Reduction to Optimize ACS Detection using the 12-Lead ECG"
Ziad Faramand, MD *Clinical & Translational Science Institute (CTSI)* R01HL137761	9/2019–8/2020 **Co-Chair**	"Prognostic Value of HEART score in Patients with Cocaine Associated Chest Pain: An Age-and-Sex Matched Cohort Study"
Lucas Besomi, BS *Electrical & Computer Engineering Department* R01HL137761	9/2018–8/2019 **Co-Chair**	"Predicting Acute Myocardial Ischemia using Machine Learning applied to Standard 10-second 12-lead ECG"
Kamal Althobaiti, BS *School of Public Health*	9/2018–8/2019 **Member**	"Examining HIV Prevalence and Cultural Implications of HIV Awareness in the Middle East"

BSN Honors Thesis

Name of Student, Department, & Source of Support	***Training Period & Committee Role***	***Project Title***
Catherine Brown *School of Nursing* R01HL137761	1/2023–8/2024 **Chair**	"The Association Between Mortality and Occlusion Myocardial Infarction With and Without ST-segment Elevation"
Maura Gallagher *School of Nursing* R01HL137761	9/2022–4/2023 **Chair**	"Demographic and Clinical Characteristics of Acute Coronary Syndrome Patients with Single Versus Multi-Vessel Coronary Occlusion"

Alexandra Tolassi *School of Nursing* R01HL137761	9/2021–4/2022 **Chair**	"Associations between treatment-seeking delay and clinical course of patients with suspected acute coronary syndrome at initial ED encounter"
Lacey Maclay *School of Nursing* R01HL137761	9/2020–8/2021 **Chair**	"The Role of Inflammation, Immune Responses, and Ischemic Preconditioning in Acute Myocardial Infarction"
Jennifer Stemler *School of Nursing* R01HL137761	9/2020–8/2021 **Chair**	"Taking a Closer Look at Using the Emergency Severity Index Tool at Emergency Department Triage for Patients Who Present with Suspected ACS"
Parker Landis *School of Nursing*	9/2017–8/2018 **Chair**	"Evaluating the Safety of Morphine Use in the Management of Patients with Acute Coronary Syndrome"
Diana Rivero *School of Nursing*	9/2016–8/2017 **Chair**	"Electrocardiographic abnormalities and their effect on Clinical Decision Making in patients presenting to the emergency department with chest pain"

Other Research Trainees Funded and Mentored by Dr. Al-Zaiti

Undergraduate Research Assistants (n=15)

Catherine Brown (2023−2024)
Maura Gallagher (2021−2023)
Katherine McGrath (2021−2022)
Lacey Mclay (2019–2021)
Jennifer Stemler (2019–2021)
Adrian Bermudez (2018–2019)
Madeline Reiche (2018–2019)
Parker Landis (2017–2019)
Victoria Tori (2017–2018)
Amber DeSantis (2016–2018)
Kelsey Walden (2015–2016)
Diana L Rivero (2014–2017)
Katherine G McCoy (2014–2015)
Connor R McClellan (2014–2015)
Lindsey R. Buchanan (2014–2015)
Melinda M Douglas (2013–2015)

Graduate Students Researchers (n=12)

Nursing
- Karina Kraevsky-Phillips (2022-current)
- Stephanie Helman (2020–2024)
- Hongjin Li (2018–2019)
- Mohammad Alrawashdeh (2014–2017)
- Heba Khalil (2015–2016)
- Khalil Yousef (2015–2016)
- Justin Bala-Hampton (2013–2014)

Engineering
- Rui Qi (2023-current)
- Sajida Aqtash (2023-current)
- Nathan Riek (2022–current)
- Zeinab Bouzid (2019–2024)
- Lucas Besomi (2018–2019)
- Aya Khalaf (2017–2018)
- Nicholas Scangas (2014–2015)

TEACHING

Teaching Awards & Honors

2018 **Dean's Distinguished Teaching Award**
University of Pittsburgh

2020 **Chancellor's Distinguished Teaching Award**
University of Pittsburgh

Classroom Teaching (Didactic)

Course Number & Title	*Level & Class Size*	*Terms Taught*
NUR 3082: Introduction to Machine Learning in Healthcare (3 credits)	PhD, 6-8 students	Summer 2020, Fall 2022, Summer 2023, Sum 2024
NUR 3287: Research Design and Methods (3 credits)	PhD, 6-8 students	Spring 2019, 2020, 2021, 2022
NUR 2078: Clinical Diagnostics (3 credits)	DNP, ~10 students	Summer 2015, 2016, 2017, 2021
NUR 2004: Advanced Pathophysiology Across the Life Span (4 credits)	DNP, 107 students	Fall 2016
NUR 0005: Nursing Honors Seminar (1 credit)	BSN, ~20 students	Fall 2020, 2021
NUR 0053: Introduction to Inclusion, Equity and Diversity in Health Care (1 credit)	BSN, 20 students	Spring 2020
NUR 0067: Nursing Research: An Introduction to Critical Appraisal and EBP (3 credits)	BSN, ~60 students	Fall 2019, Spring 2020
NUR 0088: Introduction to Basic Statistics for Evidence Based Practice (3 credits)	BSN, ~60 students	Fall 2017, Spring 2018

Clinical Teaching

Course Number & Title	*Level & Class Size*	*Terms Taught*
NUR 1134: Transition into Professional Nursing	BSN, 5-7 students	Fall 2015, 2016, Spring 2016, 2017
NUR 1121: Advanced Clinical Problem Solving	BSN, 7-8 students	Spring 2016, 2017

Clinical Skills Lab

Course Number & Title	*Level & Class Size*	*Terms Taught*
NUR 2031: Diagnostic Physical Exam	DNP, 5-7 students	Fall 2014, 2015, 2016, Spring 2015, 2016, 2017
NUR 0081: Foundations of Nursing Practice I	BSN, 7-8 students	Spring 2014

Guest Lectures

Course, Topic and Time Commitment	*Level & Class Size*	*Terms Taught*
NUR 0067: Nursing Research **"Systematic Reviews & Meta-Analysis"** (1.5 hours)	BSN, 45-50 students	Spring 2021, 2022; Fall 2022
NUR 2004: Advanced Pathophysiology **"Altered Cardiovascular Function"** (6 hours divided over two weeks)	DNP, ~50 students	Fall 2017, 2018, 2019, 2020, 2021, 2022, 2023, Spring 2018, 2019, 2020, 2021, 2022, 2023, 2024, Summer 2018, 2019, 2020, 2021, 2022, 2023, 2024
NUR 2078: Clinical Diagnostics **"Basic 12-Lead ECG Interpretation"** (3 hours)	DNP, ~10 students	Summer, 2018, 2019, 2020
NUR 3789: Physical Diagnosis Anesthesia **"Advanced 12-Lead ECG Interpretation"** (6 hours divided over two weeks)	Nurse Anesthesia, ~40 students	Fall 2020, 2021, 2022
NUR 3044: Cancer Survivorship **"Systematic & Scoping Reviews"** (3 hours)	PhD, ~5-6 students	Fall 2019, 2021
BIOENG 2151: Medical Product Ideation **"ECG Devices for EMS Providers"** (Mentored capstone project over 15 weeks)	M.Eng., ~5-6 students	Fall 2015, 2016
BIOENG 2151: Medical Product Development **"ECG for Telehealth Applications"** (Mentored capstone project over 15 weeks)	M.Eng., ~5-6 students	Spring 2016, 2017
NUR 3030: Professional Development **"Keys of Success for Junior Faculty"** (2 hours)	PhD, 5-6 students	Fall 2015, 2016
NUR 0082: Nursing Care of Adults **"Cultural Sensitivity in Nursing Care"** (1 hour)	BSN, ~100 students	Fall 2015, 2016, 2017

Continuing Education

Topic and Contact Hours	*Level & Class Size*	*Terms Taught*
"Intro to Machine Learning in Healthcare" (6 contact hours)	Nurse Researchers ~25	Fall 2023, Spring 2024
"Basic 12-Lead EKG Interpretation" (9 contact hours divided over 3 weeks)	Registered Nurses, ~20 students	Summer 2014, 2015, 2016, 2018
"Update on Coronary Artery Diseases" (3 contact hours)	Registered Nurses, ~20 students	Spring, 2015

PROFESSIONAL SERVICE

International Society of Computational Electrocardiology (ISCE)

2010–current	Professional Member
2017–current	Abstract Reviewer
2015–2018	Chair, Poster Session
2018–current	Chair, Conference Proceedings
2018–current	Liaison, *Journal of Electrocardiology*
2020–2022	Judge, Jos Willems Early Career Investigator Award Competition
2020–2023	Elected Officer, Board of Directors
2022	Conference Co-Chair, 46th Annual ISCE Meeting, Las Vegas, NV
2023	Conference Chair, 47th Annual ISCE Meeting, Indian Wells, CA
2023–2026	Treasurer, Board of Directors

American Heart Association (AHA)

2012–current	Professional Member
2016–2019	Member, Early Career Committee
2016–current	Abstract Reviewer, Physiological Aspects of Acute Cardiovascular Care
2017–current	Fellow of the American Heart Association (FAHA)
2018–2021	Member, Research Mentoring Committee
2018–2020	Member, Kathleen Dracup Award Committee
2018–2020	Writing Group Member, AHA Scientific Statements Taskforce
2019	Moderator, Early Career Scientific Session
2020–2022	Member, Marth N Hill New Investigator Award Committee
2020–2022	Member, Marie Cowan Promising Young Investigator Award Committee
2022–current	Member, CVSN Leadership Committee
2022–current	Chair, Marth N Hill Early Career Investigator Award Committee
2024	Moderator, Digital Poster Session #17, AHA Scientific Sessions, Chicago IL

Editorial Boards

2012–current	Section Editor (ECG Puzzler), *American Journal of Critical Care*
2018–current	Associate/Executive Editor, *Journal of Electrocardiology*
2020–current	General Editorial Board, *Heart & Lung*
2022–current	Guest Editor, *Physiologic Measurement*
2023–current	General Editorial Board, *European Heart Journal – Digital Health*

NIH Study Sections

02/2019	Reviewer, Biomedical Computing & Health Informatics (BCHI)
06/2022	Reviewer, Organization and Delivery of Health Services (ODHS)
06/2022	Reviewer, Special Emphasis Panel (ZRG1 HSS-L)
02/2023	Reviewer, Clinical Informatics & Digital Health (CIDH)
06/2023	Reviewer, Special Emphasis Panel, All of Us Data (ZRG1 IVBH)
02/2024	Reviewer, Clinical Data Management and Analysis (CDMA)
10/2024	Reviewer, Clinical Data Management and Analysis (CDMA)

Reviewer for Promotion Materials

2020	School of Nursing, Taibah University, Medina, Saudi Arabia
2022	School of Nursing, Case Western Reserve University, Cleveland, OH, USA
2022	School of Nursing, The Hong Kong Polytechnic University, Hong Kong
2023	School of Nursing, University of Iowa, Iowa City, IA, USA
2024	School of Medicine, Mayo Clinic, Rochester, MN, USA
2024	School of Nursing, Purdue University, West Lafayette, IN, USA
2024	School of Nursing, UCSF, San Francisco, CA, USA

Ad-hoc Peer Reviewer of Scientific Journals

2011–current	*Journal of Electrocardiology* (IF = 1.44)
2014–current	*Heart & Lung* (IF = 1.73)
2014–current	*EUROPACE* (IF = 5.23)
2016–current	*Circulation: Cardiovascular Quality and Outcomes* (IF = 4.61)
2016–current	*Public Library of Science (PLoS One)* (IF = 3.75)
2017–current	*Medical and Biological Engineering and Computing* (IF = 2.60)
2018–current	*Journal of Cardiovascular Nursing* (IF = 1.53)
2018–current	*Critical Care* (IF = 19.33)
2018–current	*Prehospital Emergency Care* (IF = 2.42)
2020–current	*Journal of American College of Cardiology (JACC)* (IF = 24.09)
2021–current	*Scientific Reports* (IF = 4.99)
2021–current	*Journal of the American Heart Association (JAHA)* (IF = 6.12)
2022–current	*Circulation* (IF = 39.92)
2022–current	*Nature Medicine* (IF = 87.24)

Abstract Reviewer

2010–2016	Sigma Theta Tau International (STTI)
2014–2016	Council for the Advancement of Nursing Science (CANS)
2016	Eastern Nursing Research Society (ENRS)
2016–current	American Heart Association (AHA) Scientific Sessions
2017–current	International Society of Computerized ECG (ISCE)

Local Service (University of Pittsburgh)

- University-Wide Committees

2016	Patent Reviewer, Office of Technology Management (OTM)
2017–2019	Grant Reviewer, Clinical and Translational Science Institute (CTSI)
2018–2021	Member, Senate Plant Utilization and Planning Committee (3-year term)
2019–2021	Faculty Representative, Pathways Committee, Provost Office
2021–2024	Member, Chancellor's Distinguished Teaching Award Committee
2023–2024	Member, Provost's Advisory Council on Tenure and Promotion (PACTP)
2019–2024	Grant Reviewer, CTSI Pilot Awards Program

- Office of Community Partnership:

2015	Health Fair Coordinator, Hosted at the Universal Academy of Pittsburgh in Swissvale PA, and co-sponsored by UPMC Health Plan and Walgreens

- School of Nursing Committees:

2013–2015	Member, Academic Integrity Committee
2014–2015	Member, Evaluation & Steering Committee
2015	Reviewer, Cameos of Caring Awards
2015–2024	Member, PhD Council
2015–2017	Chair, Evaluation & Steering Committee
2015–2017	Member, School-Wide Curriculum Committee
2015–2017	Member, Planning & Budget Committee
2016–2018	Member, PhD Progression & Graduation Committee
2017	Reviewer, Leslie Hoffman Research Award
2018–2020	Chair, PhD Progression & Graduation Committee
2019–2021	Chair, BSN Honors Committee
2019-2021	Chair, Reva Rubin Research Award
2020–2021	Chair, Interprofessional Education Committee
2021–2022	Chair, Roth Endowment Undergraduate Research Fund
2022–2023	Chair, Leslie Hoffman Research Award

I certify that this curriculum vitae is a current and accurate statement of my professional record.	
Signature: 	*Date:* *9/5/2024*