April 1, 2022

YEONSIK NOH, PhD

128 Skinner Hall/ 306 Knowles Engineering Building
651 North Pleasant Street
University of Massachusetts Amherst, MA 01003
(413)545-5022
ynoh@umass.edu

▪ EDUCATION

Ph.D. in Biomedical Engineering, Yonsei University, South Korea, 8/2013
Dissertation: "Design and Implementation of Intelligent Fitness Management (IFM) System based on Personalized Exercise Guidance for Obesity"
Advisors: Dr. Hyungro Yoon

M.S. in Biomedical Engineering, Yonsei University, South Korea, 2/2008
Thesis: "A Real-Time Autonomic Nervous System Evaluation System using Heart Instantaneous Frequency Signal during Exercise"
Advisors: Dr. Hyungro Yoon

B.S. in Biomedical Engineering, Yonsei University, South Korea, 2/2006

▪ PROFESSIONAL EXPERIENCE

Assistant Professor, College of Nursing/Dept. of Electrical and Computer Engineering,
University of Massachusetts Amherst, 09/2017-Present

Adjunct Assistant Professor, Dept. of Biomedical Engineering,
University of Massachusetts Amherst, 11/2018-Present

- New generation healthcare system/ strategy based on Nursing Engineering.

Postdoctoral Fellow, Dept. of Biomedical Engineering,
University of Connecticut, 09/2014-08/2017

- Developing wearable Devices for In-Home Monitoring systems.
- Developing of Flexible Carbon-Based Hydrophobic Electrodes for Skin Conductance Measurement.

Senior Hardware Engineer (Consultant),
Mobile Sense Technologies, Inc., 01/2016-08/2017

- Developing hardware (circuit design, firmware) for wearable healthcare system

Postdoctoral Fellow, Dept. of Biomedical Engineering,
Worcester Polytechnic Institute, 09/2013--08/2014

- Developing novel Conductive Carbon Black and Polydimethlysiloxane ECG Electrode for underwater.
- Developing hardware (circuit design, firmware) for ECG, EDA, and activity monitoring system.

Graduate Research Assistant, Dept. of Biomedical Engineering,
Yonsei University, 03/2006-08/2013

- Developing total exercise management solution based on intelligent bio-feedback system (Developing intelligent bio-feedback exercise prescription algorithm in real-time based on interactive sensor networks and clinical database technology supports).
- Developing exercise treatment system for paraplegia person and algorithm maximum oxygen consumption using Arm-ergometer.
- Developing a training system based on intelligent evaluation of the autonomic nervous system and cardiac function using ECG based on wireless body area network.
- Developing ultra-light portable device and analysis system for monitoring of ECG and motion activity using micro-sensor.
- Developing multi-dimensional bio-signal detection devices for the home healthcare system.

▪ RESEARCH INTERESTS

- Wearable personalized health monitor system
- Smart healthcare system based on sensor and communication network
- Individualized/ Personalized health management system based on sports medicine

▪ HONORS AND AWARDS

2019-20	Nominated as one of the finalists for 2019-2020 University Distinguish Teaching Award
2019	Armstrong Fund for Science Awards, University of Massachusetts Amherst
2016	SPART Technology Commercialization Fund Awards, University of Connecticut
2010	Best Paper Presentation, The Korea Society of Medical & Biological Engineering

- **GRANTS/ FUNDS**

CURRENT FUNDING

2022-2023 Home Healthcare Monitoring Platform based on a Cloud Native Architecture
PI: **Yeonsik Noh, PhD**
Role: Principal Investigator
Funder: University of Massachusetts Amherst; Center for Nursing and Engineering Innovation
Total Costs: $15,000

2021-2022 Real-time physiological and motor monitoring for aquatic therapy and rehabilitation
PI: **Yeonsik Noh, PhD**
Role: Principal Investigator
Funder: National Institute of Health NICHD and NINDS
One of four pilot projects submitted in 2021 as part of the P2C (Grant #P2C HD101899) application (PI: R. L. Lieber and W. Z. Rymer) for The Center for Smart Use of Technologies to Assess Real World Outcomes (C-STAR)
Total Costs (pilot only): $39,599.55
Selected by C-STAR committee, Waiting for the NIH Approval

COMPLETED/ PAST FUNDING

2019-2021 Enabling Battery-less Wearable Sensors via Intra-Body Power Transfer
PI: Sunghoon Ivan Lee, PhD
Role: **Co-Principal Investigator**
Funder: University of Massachusetts Amherst
2019 Armstrong Fund for Science Awards
Total Costs: $40,000

2016-2017 Waterproof Leadless Armband for Continuous Wireless Monitoring For Atrial Fibrillation
PI: Ki. H. Chon, PhD
Role: **Co-Principal Investigator**
Funder: University of Connecticut
2016 UCONN SPART Technology Commercialization Fund Awards
Total Costs: $50,000

2015-2019 Wearable Devices for In-Home Monitoring of Patients with Heart Failure at Risk of Decompensation
PI: Ki. H. Chon, PhD
Role: **Co-Investigator**
Funder: National Science Foundation Smart and Connected Health

2015-2017 Development of Flexible Carbon-Based Hydrophobic Electrodes for Skin Conductance Measurement
PI: Ki. H. Chon, PhD
Role: **Co-Investigator**
Funder: Office of Naval Research

GRANT SUBMITTED/ UNDER REVIEW

2022 In-home Smart and Secure Support System for Persons with Dementia and Family Caregivers
PI: **Yeonsik Noh, PhD**
Role: Principal Investigator
Funder: University of Massachusetts Amherst;
2022 MassAITC AI/TECH Aging Pilot Awards
Total Costs: $151,688.94

2021 In-home wearable system to detect early-stage decompensation in heart failure patients
PI: **Yeonsik Noh, PhD (Eligible for Early-Stage Investigator)**
Role: Principal Investigator
Funder: National Institute of Health NHLBI
Total Costs: $2,645,516
Impact Score: **34**; Percentile: **20**

GRANT SUBMITTED/NOT FUNDED

2021 Daily Fatigue Monitoring: Electrochemical and electrophysiological approach
PI: **Yeonsik Noh, PhD**
Role: Principal Investigator
Funder: University of Massachusetts Amherst
2021 Manning/IALS Innovation Award
Total Costs: $98,097.31

2021 CAREER: Personalized Underwater Exercise Management with Physiological Monitoring and Machine Learning
PI: **Yeonsik Noh, PhD**
Role: Principal Investigator
Funder: National Science Foundation
NSF Career Awards (2nd Submission)
Total Costs: $950,094

2020 CAREER: Personalized Underwater Exercise Management with Physiological Monitoring
PI: **Yeonsik Noh, PhD**
Role: Principal Investigator
Funder: National Science Foundation
NSF Career Awards
Total Costs: $938,136

2020 Leadless Wearable System for Real-Time Estimation of Quantitative Acute and chronic Fatigue Indices
PI: **Yeonsik Noh, PhD**
Role: Principal Investigator
Funder: Edward Mallinckrodt, Jr. Foundation
Not selected as one of the nominees from UMass Amherst

2020 Intravenous Medication Flow Rate Accuracy: A Comparison of Varied Head-Height Differentials Among Five IV Smart Infusion Pump Types
PI: Karen Giuliano PhD, RN
Role: **Co-Investigator**
Funder: 2020 Manning/IALS Innovation Award

2019 A Personalized Aquatic Exercise Guidance System Based on Biometric-Feedback for Improvement of Chronic Diseases
PI: **Yeonsik Noh, PhD**
Role: Principal Investigator
Funder: Moore Inventor Fellows Grant
Not selected as one of the nominees from UMass Amherst

2019 A Seamless Patch-type Skin Sensor for Daily Consecutive Stress Monitoring by Real-Time Cortisol Analysis
PI: **Yeonsik Noh, PhD**
Role: Principal Investigator
Funder: University of Massachusetts Amherst
2019 Manning/IALS Innovation Award

2018 Keeping Older Adults with Heart Failure Safe: A Systems Engineering Approach
PI: Elizabeth Henneman, PhD, RN
Role: **Co-Investigator**
Funder: National Institute of Health, Agency for Healthcare Research and Quality

2017 Novel Submersible and Terrestrial Wearable Sensor Technology for the Prediction and Rehabilitation of Post Neuromusculoskeletal Injury Secondary Health Effects
PI: Kristin Morgan, PhD (University of Connecticut)
Role: **Subcontract Principal Investigator**
Funder: United States Department of Defense

GRANT PREPARATION

2022 Multi-Channel PPG Sensor for the Navy Divers (Working title)
PI: **Rachel Lance, PhD at Duke University**
Role: Co-Investigator
Funder: Office of Naval Research

2022 Implementation of periodontal temperature and pH sensor probe (working title)
PI: **Ahyeon Koh, PhD at SUNY Binghamton University**
Role: Co-Investigator
Funder: National Institute of Health

▪ SCHOLARLY ACCOMPLISHMENTS (* indicates a paper written in Korean)

A. BOOK/BOOK CHAPTERS

1. H. Posada-Quintero, B. Reyes, N. Reljin, J. Florian, K. Chon, and **Y. Noh**, "Carbon Black/Polydimethylsiloxane Electrodes for Underwater Cardiac Electrical Activity Collection," Ch.7 in Advances in Sensors: Reviews, Physical Sensors, Sensors Networks and Remote Sensing, Vol. 5, Sergey Y. Yurish Eds.: International Frequency Sensor Association (IFSA), 2018.
2. **Y. Noh**, J. Yoon, and H. Yoon, "Automated Selection of Optimal ECG Lead Using Heart Instantaneous Frequency During Sleep," Ch. 5 in Advanced in Electrocardiograms: Methods and Analysis, Richard M. Millis Eds.: InTech, 2012. (DOI: 10.5772/23940).

B. PEER-REVIEWED JOURNAL ARTICLES

*** Graduate students are highlighted.**

1. M. Brown, L. Somma, M. Mendoza, **Y. Noh**, G. Mahler, A. Koh, "Upcycling Compact Discs for Bioelectronic Applications", *Nature Communications*, 2022 *(submitted the final version of manuscript)*
2. N. Mohammed, R. Wang, R. W. Jackson, **Y. Noh**, J. Gummeson, and S. I. Lee, "ShaZam: Charge-Free Wearable Devices via Intra-Body Power Transfer from Everyday Objects," *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)*, 5(2), No. 75, 1-25, 2021. (DOI: https://dl.acm.org/doi/10.1145/3463505)
3. M. B. Hossain, S. K. Bashar, J. Lázaro, N. Reljin, **Y. Noh** and K. H. Chon, "A robust ECG denoising technique using variable frequency complex demodulation," *Computer Methods and Programs in Biomedicine*, 200, 105856, 2021.
4. S. Sinha, H. Posada-Quintero**, Y. Noh**, C. Allen, R. Daniels, K. H. Chon, L. Sloan, G. A. Sotzing, "Integrated dry poly(3,4-ethylenedioxythiophene):polystyrene sulfonate electrodes on finished textiles for continuous and simultaneous monitoring of

electrocardiogram, electromyogram and electrodermal activity," *Flex. Print. Electron*, 5, 035009, 2020.

5. N. Reljin, J. Lázaro, M. B. Hossain, **Y. Noh**, C. Cho, and K. H. Chon, "Using the Redundant Convolutional Encoder–Decoder to Denoise QRS Complexes in ECG Signals Recorded with an Armband Wearable Device", *Sensors*, 20(16), 4611, 2020.
6. J. Lázaro, N. Reljin, R. Bailón, E. Gil, **Y. Noh**, P. Laguna, and K. H. Chon, "Electrocardiogram derived respiratory rate using a wearable armband," IEEE Trans *Biomed Eng*., 2020. 10.1109/TBME.2020.3004730
7. J. Lázaro, N. Reljin, M. B. Hossain, **Y. Noh**, P. Laguna, and K. H. Chon, "Wearable Armband Device for Daily Life Electrocardiogram Monitoring," *IEEE Trans Biomed Eng*., 2020. doi**:** 10.1109/TBME.2020.2987759
8. S. Sinha, F. A. Alamer, S. J. Woltornist, **Y. Noh**, F. Chen, A. McDannald, C. Allen, R. Daniels, A. Deshmukh, M. Jain, K. Chon, D. H. Adamson, and G. A. Sotzing, "Graphene and Poly(3,4-ethylene dioxythiophene): Poly(4-styrene sulfonate) on Nonwoven Fabric as a Room Temperature Metal and Its Application as Dry Electrodes for Electrocardiography," ACS Appl. Mater. Interfaces, Vol. 11, 32339-32345, 2019.
9. S. K. Bashar, **Y. Noh**, A. J. Walkey, D. D. McManus, and K. H. Chon, "VERB: VFCDM-Based Electrocardiogram Reconstruction and Beat Detection Algorithm," IEEE Access, Vol. 7, 13856-13866, 2019.
10. H. Posada-Quintero, N. Reljin, C. Eaton-Robb**, Y. Noh**, J. Riistama, and K. H. Chon, "Analysis of Consistency of Transthoracic Bioimpedance Measurements Acquired with Dry Carbon Black PDMS Electrodes, Adhesive Electrodes and Wet Textile Electrodes," Sensors, Vol. 18, No. 6, 1719, 2018.
11. H. Posada-Quintero, **Y. Noh**, C. Eaton-Robb, J. P. Florian, and K. H. Chon, "Feasibility Testing of Hydrophobic Carbon Electrodes for Acquisition of Underwater Surface Electromyography Data, " Ann Biomed Eng, Vol. 46, No. 9, pp. 1397-1405, 2018.
12. **Y. Noh**, H. Posada-Quintero, Y. Bai, J. White, J. P. Florian, P. R. Brink, and K. H. Chon, " Effect of shallow and deep SCUBA dives on heart rate variability, " Frontiers in Physiology, 9:110, 2018.
13. S. Sinha, **Y. Noh**, N. Reljin, G. Treich, S. Hajeb-Mohannadalipour, Y. Guo, K. Chon, and G. Sotzing, "Screen Printed PEDOT:PSS Electrodes on Commercial Finished Textiles for Electrocardiography," ACS Applied Materials & Interfaces, Vol. 9, No. 43, pp. 37524–37528, 2017. (DOI: 10.1021/acsami.7b09954).
14. H. Posada-Quintero, R. Rood, **Y. Noh**, K. Burnham, J. Pennace, K. Chon, "Dry Carbon/Salt Adhesive electrodes for recording Electrodermal Activity," Sensors & Actuators: A. Physical, Vol. 257, pp. 84-91, 2017 (DOI: https://doi.org/10.1016/j.sna.2017.02.023).
15. D. Dao, S. M. A. Salehizadeh, **Y. Noh**, J. Chong, C. Cho, D. McManus, C.E. Darling, Y. Mendelson and K. H. Chon, "A Robust Motion Artifact Detection Algorithm for Accurate Detection of Heart Rates from Photoplethysmographic Signals using Time-Frequency Spectral Features," IEEE Journal of Biomedical and Health Informatics, Vol. 21, No. 5, pp. 1242-1253, 2016 (DOI: 10.1109/JBHI.2016.2612059).

16. **Y. Noh**, J. Bales, B. Reyes, J. Molignano, A. Clement, G. Pins, J. Florian, and K. Chon, "Novel Conductive Carbon Black and Polydimethlysiloxane ECG Electrode: A Comparison with Commercial Electrodes in Fresh, Chlorinated, and Salt Water," Ann Biomed Eng, Vol. 44, No. 8, pp. 2464-2479, 2016. (DOI: 10.1007/s10439-015-1528-8).
17. J. Yoon, **Y. Noh**, Y. Kwon, S. Park, and H. Yoon, "Improvement of dynamic respiration monitoring through sensor fusion of accelerometer and gyro-sensor," Journal of Electrical Engineering & Technology, Vol. 9, No. 1, pp. 334-343, 2014. (DOI: 10.5370/JEET.2014.9.1.334).
18. M. Sim, M. Kim, C. Yoon, J. Chung, **Y. Noh**, S. Park and H. Yoon, "Preceding research for estimating the maximal fat oxidation point through heart rate and heart rate variability," The Transactions of KIEE, Vol. 61, No. 9, pp. 1221-1225, 2012. (DOI: 10.5370/KIEE.2012.61.9.1340).
19. U. Yoon, **Y. Noh**, and H. Yoon, "Optimization Methods for Improving the Performance of Heart Rate Detection by a Wearable ECG System During High-intensity Exercise," Biomed Eng Lett, Vol.1, No. 2, pp. 143-150, 2011. (DOI: 10.1007/s13534-011-0023-x).
20. I. Hwang, Y. Noh, I. Jeong, and H. Yoon, "Optimized Exercise Load Control System Based on Heart Rate Variability," Biomed Eng Lett, Vol.1, No. 4, pp. 232-238, 2011. (DOI: 10.1007/s13534-011-0037-4).
21. *E. Kim, **Y. Noh**, K. Seo, S. Park, and H. Yoon, "The Novel Method of Segmental Bio-Impedance Measurement Based on Multi-Frequency for a Prediction of Risk Factors Life-Style Disease of Obesity," J. Biomed. Eng. Res, Vol. 31, pp. 375-384, 2010. (DOI: 10.9718/JBER.2010.31.6.375).
22. *T. Lim, K. Seo, I. Jeong, S. Jun, **Y. Noh**, E. Kim, and H. Yoon, "Novel Impedance Method for Analyzing Truncal Obesity," The Transactions of KIEE, Vol.58, No. 4, pp. 849-856, 2009.
23. **Y. Noh**, S. Park, S. Park, and H. Yoon, "Design of Real-Time Autonomic Nervous System Evaluation System Using Heart Instantaneous Frequency," Journal of Electrical Engineering & Technology, Vol. 3, No. 4, pp. 576-583, 2008. (DOI: 10.5370/JEET.2008.3.4.576).
24. S. Park, **Y. Noh**, S. Park, and H. Yoon, "An improved algorithm for respiration signal extraction from electrocardiogram measured by conductive textile electrodes using instantaneous frequency estimation," Med Bio Eng Comput, Vol. 46, pp. 147-158, 2008. (DOI: 10.1007/s11517-007-0302-y).

C. CONFERENCE PRECEEDINGS (ORAL presentations) († Oral presentation in person)

*** Graduate students are highlighted.**

1. A. Amin, S. Wang, and **Y. Noh**, "Applicability of Cloud Native-based Healthcare Monitoring Platform (CN-HMP) in Older Adult Facilities," IEEE EMBC Conference, Glasgow, United Kingdom, Jul. 11-15, 2022 *(Accepted)*.
2. †**Y. Noh**, J. S. Chang, K. H. Chon, H. Yoon, I. C. Jeong, I. D. Kong, "The Effect of a Personalized Automated Exercise Guidance System on the Improvement of obesity," Innovation in Aging 4 (Supplement_1), 843-844, 2020.

3. J Lázaro, N. Reljin, R. Bailón, E. Gil, **Y. Noh**, P. Laguna, K. H. Chon, "An ECG-Based System for Respiratory Rate Estimation Tested on a Wearable Armband during Daily Life," Computing in Cardiology, 2020
4. M. B. Hossain, J. Lázaro, **Y. Noh**, and K. H. Chon, "Denoising Wearable Armband ECG Data Using the Variable Frequency Complex Demodulation Technique," IEEE EMBC Conference, Montreal, Canada, Jul. 20-24, 2020.
5. J. Lázaro, N. Reljin, R. Bailón, E. Gil, **Y. Noh**, P. Laguna, and K. H. Chon, "Electrocardiogram Derived Respiration for Tracking Changes in Tidal Volume from a Wearable Armband," IEEE EMBC Conference, Montreal, Canada, Jul. 20-24, 2020.
6. J. Lázaro, N. Reljin, **Y. Noh**, P. Laguna, and K. H. Chon, " Heart Rate Variability Monitoring Using a Wearable Armband," Computers in Cardiology, 2019.
7. J. Lázaro, N. Reljin, **Y. Noh**, P. Laguna, and K. H. Chon, "Feasibility of Long-Term Daily Life Electrocardiogram Monitoring Based on a Wearable Armband Device," IEEE EMBC Conference, Berlin, Germany, Jul. 23-27, 2019.
8. J. Lázaro, R. Bailon, E. Gil, **Y. Noh**, P. Laguna, and K. H. Chon, "Pilot Study on Electrocardiogram Derived Respiratory Rate using a Wearable Armband," Computers in Cardiology, 2018.
9. **Y. Noh**, X. Ye, L. Murphy, C. Eaton-Robb, T. Dimitrov, W. J. Choi, and K. H. Chon, "Increased Conductivity and Reduced Settling Time of Carbon Based Electrodes by Addition of Sea Salt for Wearable Application ," IEEE EMBC Conference, Honolulu, HI, USA, Jul. 17-21, 2018.
10. N. Reljin, H. Posada-Quintero, **Y. Noh**, C. Eaton Robb, T. Dimitrov, L. Murphy, J. Riistama, and K. H. Chon, "Preliminary Results on Transthoracic Bioimpedance Measurements with a Variety of Electrode Materials," IEEE Biomedical and Health Informatics (BHI) and the Body Sensor Networks (BSN) Conference, Las Vegas, NV, USA, Mar. 4-7, 2018.
11. E. Ding, D. Liu, A. Soni, O. Adaramola, D. Han, S. Bashar, **Y. Noh**, K. H. Chon, and D. D. McManus, "Impressions of Older Patients with Cardiovascular Diseases to Smart Devices for Heart Rhythm Monitoring," Connected Health: Applications, Systems and Engineering Technologies (CHASE), 2017 IEEE/ACM International Conference on, 2017. (DOI: 10.1109/CHASE.2017.97)
12. H. Posada-Quintero, R. Rood, **Y. Noh**, K. Burnham, J. Pennace, and K. Chon, "Novel Dry Electrodes for Recording Electrodermal Activity," in proceedings of 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'16), Boston, MA, USA, Aug. 16-20, 2016.
13. S. Salehizadeh, **Y. Noh**, and K. Chon, "Heart Rate Monitoring in Electrocardiogram Wearable Devices during Intense Physical Activities using A Motion Artifact Corrupted Signal Reconstruction Algorithm," The first IEEE Conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE 2016), Washington DC, USA, Jun. 27-29, 2016.
14. †**Y. Noh**, J. Bales, B. Reyes, J. Chong, and K. Chon, "Examination of The Novel CB/PDMS Electrode for ECG Monitoring Under Chlorine Water," ACSM 62nd Annual

Meeting, Medicine and Science in Sports and Exercise, Vol. 47:5 Supplement, San Diego, CA, USA, May 26-30, 2015.

15. Y. Kwon, **Y. Noh**, J. Yoon, S. Park, and H. Yoon, "A Novel Approach to Classify Human motion in Smart Phone using 2D-projection Method," 10th IASTED International Conference on Biomedical Engineering (BioMed 2013), Innsbruck, Feb. 13-15, 2013. (DOI: 10.2316/P.2013.791-049).
16. †**Y. Noh**, Y. Han, U. Yoon, I. Hwang, J. Jung, I. Jeong, and H. Yoon, "Development of Sports Health Care System Suitable to the Fitness Club Environment," in 2010 IEEE EMBS Conference on Biomedical Engineering and Sciences (IECBES), pp. 93-96, Kuala Lumpur, Malaysia, Nov. 30-Dec. 2, 2010. (DOI: 10.1109/IECBES.2010.5742206).
17. J. Jung, **Y. Noh**, Y. Han, U. Yoon, I. Hwang, I. Jeong, and H. Yoon, "A Preliminary Study on Autonomic Nervous System Assessment during Aerobic Exercise using TEMPV," in 2010 IEEE EMBS Conference on Biomedical Engineering and Sciences (IECBES), pp. 261-264, Kuala Lumpur, Malaysia, Nov. 30-Dec. 2, 2010. (DOI: 10.1109/IECBES.2010.5742240).
18. U. Yoon, **Y. Noh**, Y. Han, M. Kim, J. Jung, I. Hwang, I. Jeong, and H. Yoon, "Electrocardiogram Signal Processing Method for Exact Heart Rate Detection in Physical Activity Monitoring System: Wavelet approach," in 2010 IEEE EMBS Conference on Biomedical Engineering and Sciences (IECBES), pp. 232-235, Kuala Lumpur, Malaysia, Nov. 30-Dec. 2, 2010. (DOI: 10.1109/IECBES.2010.5742234).
19. †**Y. Noh**, S. Park, S. Park, and H. Yoon, "Monitoring of Respiratory Frequency using Heart Instantaneous Frequency during Sleep," in u-Healthcare 2010: 7th International conference on ubiquitous healthcare, Jeju, South Korea, Oct. 28-30, 2010.
20. U. Yoon, I. Hwang, **Y. Noh**, I. Jeong, and H. Yoon, "Comparison of CWT with DWT for Detecting QRS Complex on Wearable ECG Recorder," in Wavelet Analysis and Pattern Recognition (ICWAPR), 2010 International Conference on, pp. 300-303, Qingdao, China, Jul. 11-14, 2010. (DOI: 10.1109/ICWAPR.2010.5576361).
21. †**Y. Noh**, S. Park, S. Park, and H. Yoon, "A Novel Approach to Classify Significant ECG Data Based on Heart Instantaneous Frequency and ECG-derived Respiration using Conductive Textiles," in proceedings of 29th annual conference of IEEE Engineering in Medicine and Biology Society, pp. 1503-1506, Lyon, France, Aug.22-26, 2007. (DOI: 10.1109/IEMBS.2007.4352586).

D. CONFERENCE PROCEEDINGS (Poster presentations)

*** Graduate students are highlighted.**

1. Y. Kim, U. David, and **Y. Noh**, "Classification of Aggressive Behaviors Based on sEMG Feature Extraction and Machine Learning Algorithm," Innovation in Aging 4 (Supplement_1), 656, 2020.
2. S. Sinha, Z. Li, **Y. Noh**, K. Chon, Y. Cao, and G. Sotzing, "Organic conductive polymers as printed electronics on fabrics for wearable electronics," Abstracts of Paper of the American Chemical Society, 257, 2019

3. S. Sinha, **Y. Noh**, N. Reljin, Y. Guo, G. Treich, K. Chon, and G. Sotzing, "Conducting polymers as materials for wearable electronics and its application as biopotential electrodes," Abstracts of Paper of the American Chemical Society, 255, 2018
4. S. Sinha, **Y. Noh**, G. Treich, S. Hajeb-Mohammadalipour, K. Chon, and G. Sotzing, "All Organic Screen Printed Electrodes for Continuous Recording of Electrocardiogram," ECS Meeting Abstract, 2017.
5. S. Sinha, **Y. Noh**, G. Treich, S. Hajeb-Mohammadalipour, K. Chon, and G. Sotzing, "Continuous electrocardiogram (ECG) measurement via optimization of electrochemical state of a conductive polymer on fabric," 253rd ACS (American Chemical Society) National Meeting in San Francisco, CA, 2016. Accepted.
6. **Y. Noh**, C. Cho, S. Salehizadeh, B. Reyes, J. Bales, and K. Chon, "A Novel CB/PDMS Electrode for ECG Monitoring during Swimming," ACSM 63rd Annual Meeting, Medicine and Science in Sports and Exercise, Vol. 48:5 Supplement, 2016.
7. **Y. Noh**, and H. Yoon, "Monitoring of Thermoregulatory Response during Regular Intermediate-Intensity Exercise by using Variations in Trunk Skin Temperature," ACSM 61st Annual Meeting, Medicine and Science in Sports and Exercise, Vol. 46:5 Supplement, 2014.
8. **Y. Noh**, Y. Kwon, J. Lee, J. Yoon, H. Yoon, "Classifying Physical Activity Patterns with a Smart Phone Accelerometer," ACSM 60th Annual Meeting, Medicine and Science in Sports and Exercise, Vol. 45:5 Supplement, 2013.
9. *J. Yoon, S. Chang, **Y. Noh**, Y. Kwon and H. Yoon, "The Development of a Fuzzy-based Activity Classification Algorithm to Improve the Accuracy of a Wrist-worn Calorimeter," in Conference of The Korean Society of Medical & Biological Engineering, Vol. 46, Nov 2012.
10. *Y. Kwon, **Y. Noh**, J. Yoon and H. Yoon, "Preprocessing Techniques for Gait Speed Recognition from Acceleration Data," in Conference of The Korean Society of Medical & Biological Engineering, Vol. 46, Nov 2012.
11. *J. Yoon, **Y. Noh**, Y. Han, Y. Kwon and H. Yoon, "Improvement of Accuracy for Energy Expenditure Estimation based on Accelerometer and heart rate in Period of Recovery," in Conference of The Korean Society of Medical & Biological Engineering, Vol. 45, May 2012.
12. *Y. Han**, Y. Noh**, J. Jung, J. Yoon and H. Yoon, "The Pattern Classification of Exercise Intensity using the RR Interval and the Standard Deviation for RR Interval," in Conference of The Korean Society of Medical & Biological Engineering, Vol. 43, May 2011.
13. *S, Yoo, **Y, Noh**, Y, Nam and H, Yoon, "Development of the Total Exercise Management System Based on Intelligent Bio-feedback," in Conference of the Korean Institute of Information Scientists and Engineers, Vol. 38(1B), 2011.
14. *J. Jung, **Y. Noh**, Y. Han, J. Yoon and H. Yoon, "A Preliminary Study on Trunk Skin Temperature Measurement during Treadmill Exercise," in Conference of The Korean Society of Medical & Biological Engineering, Vol. 43, May 2011.

15. *I. Hwang, **Y. Noh**, U. Yoon, J. Jung, Y. Han, I. Jeong and H. Yoon, "Design of a MISO PID Controller for Real-Time Biofeedback Exercise System," in Conference of The Korean Society of Medical & Biological Engineering, Vol. 42, Nov 2010.
16. *Y. Han, **Y. Noh**, J. Jung, I. Hwang, U. Yoon, I. Jeong and H. Yoon, "Real-Time Bio-signal Monitoring System using Android-based Smartphone," in Conference of The Korean Society of Medical & Biological Engineering, Vol. 42, Nov 2010.
17. *U. Yoon, J. Jung, Y. Han, I. Hwang, **Y. Noh**, I. Jeong and H. Yoon, "The Variation of ECG Signal RMS Value on Various Skin Moisture using Textile Electrode," in Conference of The Korean Society of Medical & Biological Engineering, Vol. 41, May 2010.
18. ***Y. Noh**, I. Hwang, J. Jung, Y. Han, U. Yoon and H. Yoon, "Measurement of Aerobic Exercise Capacity by Cardiac Output based on Pressure Recording Analytical Method (PRAM)," in Conference of The Korean Society of Medical & Biological Engineering, Vol. 41, May 2010.
19. *U. Yoon, **Y. Noh**, I. Hwang, J. Jung, Y. Han, I. Jeong and H. Yoon, "To Detect ECG using Wearable Sensor and Cancelling Noise using Wavelet during Exercise," in Conference of The Korean Society of Medical & Biological Engineering, Vol. 40, Nov 2009.
20. *I. Hwang, J. Jung, **Y. Noh**, U. Yoon, Y. Han, I. Jeong and H. Yoon, "Development of Real-Time Biofeedback Exercise Prescription System using PID," in Conference of The Korean Society of Medical & Biological Engineering, Vol. 40, Nov 2009.
21. ***Y. Noh**, Y. Han, U. Yoon, I. Hwang, J. Jung, I. Jeong and H. Yoon, "Consideration from Parameters based on Age for Estimation of Maximal Heart Rate," in Conference of The Korean Society of Medical & Biological Engineering, Vol. 40, Nov 2009.
22. *H. Shim, **Y. Noh**, S. Lee, H. Yoon and Y. Yoon, "The Management System for Emergency Holter ECG Data,", in Conference of The Korean Society of Medical & Biological Engineering, Vol. 38, Nov 2008.
23. *S. Jung, W. Choi, **Y. Noh**, I. Jeong and H. Yoon, "A Treadmill Control using Standard Deviation of Heart Rate Variability," in Conference of The Korean Society of Medical & Biological Engineering, Vol. 36, Nov 2007.
24. *S. Park, **Y. Noh**, S. Park and H. Yoon, "Analysis of Heart Instantaneous Frequency using PPG Signal and Correlation with Heart Rate Variability," in Conference of The Korean Society of Medical & Biological Engineering, Vol. 36, Nov 2007.
25. ***Y. Noh**, S. Park, S. Park and H. Yoon, "A Study of ECG Measurement in Treadmill and Transmission using Chirp Spread Spectrum (CSS) Method," in Conference of The Korean Society of Medical & Biological Engineering, Vol. 34, Nov 2006.
26. **Y. Noh**, S. Park, K. Hong, Y. Yoon, and H. Yoon, "A Study of Significant Data Classification between EDR Extracted and Frequency Analysis of Heart Rate Variability from ECG using Conductive Textile," in World Congress of Medical Physics and Biomedical Engineering (WC 2006), pp.3958-3961, 2006.

E. CONFERENCE SYMPOSIUM PRESENTATION

1. **Y.Noh**, "The Effect of a Personalized Automatic Exercise guidance System on the Improvement of Obesity," Symposium session of A New Lens on Physical Activity Promotion: Can Technology Boost Exercise Prescription and Adherence?, in Gerontological Society of America (GSA) Annual Scientific (Online) Meeting, November. 5, 2020.
2. **Y.Noh**, "The Effect of a Personalized Automatic Exercise guidance System on the Improvement of Obesity," Symposium session of Adherence to Technology-Based Exercise Prescription in Older Adults With/out Cognitive Impairments, in American Congress of Rehabilitation Medicine (ACRM) Annual (Online) Meeting, September. 26, 2021.

▪ PATENTS

1. S. M. A. Salehizadeh, K. H. Chon and **Y. Noh**, "Method And Apparatus For Heart Rate Monitoring Using An Electrocardiogram Sensor," US Patent 9,872,652, USA.
2. S. M. A. Salehizadeh, K. H. Chon and **Y. Noh**, "Method And Apparatus For Removing Motion Artifacts From Biomedical Signals," US Patent 10,278,647, USA.
3. J. Jang, Y. Lee, I. Kong, **Y. Noh**, I. Kwon, H. Yoon, "System and Method for Monitoring Paraplegia Patient's Heart Rate," Registration No. 1015610890000 (Oct. 12. 2015), South Korea
4. H. Yoon, I. Hwang, **Y. Noh**, J. Jung, U. Yoon, S. Cho, H. Kim, J. Lee, I. Jeong, K. Lee, Y. Han, "Automatic Control System of Sport Apparatus by User's Condition," Registration No. 1013555060000 (Jan. 20. 2014), South Korea.
5. H. Yoon, T. Shin, T. Kim, W. Choi, J. Jung, Y. Han, J. Yoon, **Y. Noh**, S. Cho, J. Lee, I. Jeong, K. Lee, S. Jung, U. Jeong, "Novel Method to Detect Ventilatory-Threshold in Real-Time," registration No. 1013335110000 (Nov. 21. 2013), South Korea.
6. H. Kim, H. Yoon, **Y. Noh**, U. Yoon, I. Hwang, J. Jung, S. Cho, I. Jeong, J. Lee, K. Lee, T. Shin, T. Kim, W. Choi, "Method of Exercise Prescription," Registration No. 1013013050000 (Aug. 22. 2013), South Korea.
7. H. Yoon, **Y. Noh**, U. Yoon, I. Hwang, J. Jung, S. Cho, I. Jeong, J. Lee, K. Lee, "Bio-Signal Measurement Unit of Exercise Prescription System," Registration No. 1012039020000 (Nov. 16. 2012), South Korea.
8. H. Yoon, K. Seo, K. Nam, S. Jun, I. Jeong, **Y. Noh**, J. Ko, "Bio-Signal Measurement Device of Mouse Type," Registration No. 1010428270000 (Jun. 13. 2011), South Korea.

▪ PROFESSIONAL ACTIVITIES

A. PROFESSIONAL MEMBERSHIPS AND LEADERSHIPS

2022 **Editorial Board as an Associate Editor,** Biomedical Sensors and Wearable Systems track at 2022 IEEE EMBC annual conference

2021-present	**Guest Editor**, Sensors, Novel Wearable ECG sensors and Signal Analysis of ECG Data
2020-present	**Guest Associate Editor**, Frontiers in Electronics, Wearable Electronic Devices for Health Monitoring
2019-present	**Member,** Institute of Electrical and Electronics Engineers (IEEE) Circuits and System Society
2018-present	**Member,** Gerontological Society of America (GSA)
2018-present	**Associate member,** IEEE EMBS Technical Committee on Wearable Biomedical Sensors and System (WBSS)
2016-present	**Member,** IEEE
	Member, IEEE Engineering in Medicine and Biology Society
2014-2021	**Member,** American Association for the Advancement of Science (AAAS)

B. REVIEWERS

2021-present	**Review Editor**, Frontiers in Public Health, Aging and Public Health
2021-present	**Review Editor**, Frontiers in Physiology, Physio-logging
2017-present	**Reviewer,** Sensors
2019	**Reviewer,** Energies

C. SERVICES IN DEPARTMENT/COLLEGE/UNIVERSITY

2019-2021	**Member,** Diversity and Social Justice Committee, College of Nursing
2020-2021	**Member,** Graduate Seminar Committee, ECE Department
2019-2020	**Member,** PhD Academic Matters Committee, College of Nursing
2018-2019	**Member,** Personnel Committee, College of Nursing

D. INVITED PRESENTATIONS

2019	**Invited Speaker,** Electronics Packaging Symposium, Niskayuna, NY Title: A Hydrophobic Conductive CB/PDMS Electrode for Health Monitoring in Any Environment: Evaluation on Land and Underwater
2018	**Invited Speaker**, Dasan Conference, Seoul, South Korea Title: A New Multidisciplinary Approach for Next Generation of Healthcare Paradigm: Nursing Engineering
2018	**Invited Speaker**, University of Massachusetts Amherst Title: A New Approach for Healthcare System Design based on Nursing Engineering

▪ EDUCATIONAL ACTIVITIES

A. TEACHINGS AND COURSE INSTRUCTIONS

Semester	Course	Credit	Enrolled	Score
2022 Spring	ECE124 Intro/Digital and Computer Sys (Lecture)	4	142	
	ECE124 Intro/Digital and Computer Sys (Discussion#1)	†	24	
	ECE124 Intro/Digital and Computer Sys (Discussion#2)	†	59	
	ECE124 Intro/Digital and Computer Sys (Discussion#3)	†	59	
2021 Fall	N735 Informatics for Nursing Practice	3	19	N/A
2021 Spring	ECE124 Intro/Digital and Computer Sys (Lecture)	4	149	3.6/5.0
	ECE124 Intro/Digital and Computer Sys (Discussion#1)	†	33	3.7/5.0
	ECE124 Intro/Digital and Computer Sys (Discussion#2)	†	62	3.9/5.0
	ECE124 Intro/Digital and Computer Sys (Discussion#3)	†	55	3.8/5.0
2020 Fall	N735 Informatics for Nursing Practice	3	31	*N/A
2020 Spring	ECE 124 Intro/Digital and Computer Sys (Lecture)	4	179	*3.1/5.0
	N604 Intro/Stats for Health Research	3	8	*4.3/5.0
2019 Fall	N735 Informatics for Nursing Practice	3	27	4.6/5.0
2019 Spring	ECE124 Intro/Digital and Computer Sys (Discussion#1)	†	50	4.0/5.0
	ECE124 Intro/Digital and Computer Sys (Discussion#2)	†	50	4.2/5.0
	ECE124 Intro/Digital and Computer Sys (Discussion#3)	†	44	4.3/5.0
	N604 Intro/Stats for Health Research	3	5	4.0/5.0
2018 Fall	N735 Informatics for Nursing Practice	3	20	3.8/5.0
2018 Spring	N604 Intro/Stats for Health Research	3	7	3.8/5.0

Score = Overall rating of the instructor's teaching

† = Discussion sections are parts of the ECE 124 course (4 Credits).

** In response to the COVID-19 transition to remote instruction, the Provost suspended campus-wide SRTI administration*

B. PhD GRADUATE STUDENTS

2021- Student Name: Abu Bony Amin
Committee member: **Yeonsik Noh (Chair)**
Department: Electrical and Computer Engineering

2020-2021 Student Name: Youngjun Kim
Committee member: **Yeonsik Noh (Chair)**
Department: Electrical and Computer Engineering
Left before the graduate thesis program due to personal reason

2019-2020 Student Name: Rui Bao
Committee member: **Yeonsik Noh (Chair)**
Department: Electrical and Computer Engineering
Left before the graduate thesis program due to personal reason

C. MASTER GRADUATE STUDENTS

2021- [Thesis] Student Name: Shiyang Wang
Thesis Committee member: **Yeonsik Noh (Chair)**
Department: Electrical and Computer Engineering
Title: A Cloud-Native Architecture for Healthcare (working title)
Expected graduate date: January 2023.

2020-2021 [Thesis] Student Name: Uchechukuwu David
Thesis Committee member: **Yeonsik Noh (Chair)**, Michael Zink, Jeremy Gummeson, and Erin Lamoureux
Department: Electrical and Computer Engineering
Title: A Cloud Infrastructure for Large Scale Health Monitoring in Older Adult Care Facilities

D. GRADUATE STUDENTS MENTORING

2021 [PhD] Student Name: Ali Kiaghadi
Committee member: Daniel Holcomb (Chair), David McLaughlin, Deepak Ganesan, and **Yeonsik Noh**
Department: Electrical and Computer Engineering
Title: Fabric as a Sensor: Towards Unobtrusive Sensing of Human Behavior with Triboelectric Textiles

2019 [PhD] Student Name: Samaneh Ghandali
Committee member: Christof Paar (Chair), Daniel Holcomb, Wayne Burleson, and **Yeonsik Noh**
Department: Electrical and Computer Engineering
Title: Stealthy Parametric Hardware Trojans

2019 [PhD] Student Name: Mohammed Alghenaimi
Committee member: Jeungok Choi (Chair), Cynthia Jacelon, and **Yeonsik Noh**

Department: College of Nursing
Title: Developing a Handheld Application: A Tablet-based Clinical Evaluation Tool (TABCET) For Clinical Instructors' Evaluation of Nursing Students

2018 [Master Thesis] Student Name: Neev Kiran
Thesis Committee member: Daniel Holcomb (Chair), Sunghoon Ivan Lee, and **Yeonsik Noh**
Department: Electrical and Computer Engineering
Title: Skinny Sensor: Enabling Battery-less Wearable Sensors Via Intrabody Power Transfer

2021 [Independent Study] Student Name: Yuran Qin
Department: Electrical and Computer Engineering
Title: Heating Socks: Personalized Temperature Control of the Hot-Perception Reflected by the EDA Response to Improve Sleep Quality

2020 [Independent Study] Student Name: Pooja Patil
Department: Electrical and Computer Engineering
Title: Armband Wearable Device for continuous Monitoring of Blood-Related Parameters Using Multi-Channel Photoplethysmograms (PPGs)

E. UNDERGRADUATE HONORS STUDENTS MENTORING

2019-2020 Student Name: Emma Fiore
Department: Electrical and Computer Engineering
Title: Bluetooth Wearable and Coaching App for Rowing

2018-2019 Student Name: Hubert Lin
Department: Electrical and Computer Engineering
Title: Development of An Approach to Stress Identification for Devices with Wearable Application through comparison of electroencephalogram and Electrodermal Activity Signals

2018-2019 Student Name: Eric Lee
Department: Electrical and Computer Engineering
Title: Development of Wearable Physical Activity Screening Tool

2018-2019 Student Name: Anli Xiang
Department: College of Nursing
Title: Perception of Physical Activity

2018-2019 Student Name: David Welch
Department: Electrical and Computer Engineering
Title: Development of Real-time Health Data to AI Speaker Relay System

F. UNDERGRADUATE SENIOR DESIGN (CAPSTONE) PROJECTS MENTORING

2020-2021 Student Name: Michael Burton, Connor Loughman, Adam Maciaszek, and John Murray (Team 2)
Department: Electrical and Computer Engineering

	Title: Shiver-Ring **3rd place of 2021 SDP People's Choice**
2020-2021	Student Name: Areeba Khan, Dalton Macres, Daniel Menzin, Erisha Joseph, and Evan Dempsey Department: Biomedical Engineering Title: Eye exercise device for the improvement of brain performance via smartphone
2017-2018	Student Name: Sai Yarram, Nick Raymond, Andrew Sjogren, Maxwell Gerhardson (Team 11) Department: Electrical and Computer Engineering Title: PerFectIT

G. INSTRUCTIONAL ACTIVITIES (NON-CREDIT BASED)

2018	**Guest speaker**, N210 (Instructor: Prof. Lisa Chiodo) Title: Nursing Engineering
2017	**Guest Speaker**, CS390N (Instructor: Prof. Sunghoon Ivan Lee) Title: Personalized Healthcare Systems - An Interdisciplinary Approach Based on Nursing Engineering

H. OUTREACHES

2022	**Lecturer**, Workshops for the Engineering & Society Summit 2022 for admitted students and high school juniors, specifically for women, students of color, and first-generation. Location: UMass Amherst *(Will be presenting on April 9, 2022)* Title: Multidisciplinary Approach for the Future Healthcare Wearable Devices
2018-2020	**Lecturer**, Summer Engineering Institute (SENGI) program for K-12 grades Location: UMass Amherst Title: Wearable Biometric Devices in Nursing Engineering
2019	**Facilitator**, Inaugural Nursing PhD Symposium Assisting with technical issues on the nursing research topics