Hyun J. Kwon, Ph.D.

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EDUCATION :

Ph.D. Department of Chemical Engineering, University of Louisville, Louisville, 2002
Thesis:"Theoretical and experimental investigation on the sensing performance of fiber optic immunosensor for Protein C quantification in physiological samples", Advisor: Kyung A. Kang, Ph.D.

M.S. Department of Chemical Engineering, Korea Advanced Institute of Science and Technology (KAIST), Korea, 1998, Thesis: "A study on sensing performance of NO_2 gas sensor using QCM and H_2Pc LB film"

B.S. Department of Chemical Engineering, KAIST, Korea, 1996

RESEARCH INTERESTS:

Biosensor development, QCM-D sensor, biomedical device, Olfactory signal transduction, COMSOL simulation on fluid and mass transfer, development of paper based biosensor.

PROFESSIONAL EXPERIENCES:

2015-present Chair and professor, Dept. of Engineering, Andrews University
2010-2015 Associate professor, Department of Engineering and Computer Science, Andrews University
2005-2010 Assistant professor, Department of Engineering and Computer Science, Andrews University
2002-2005 post-doc researcher, Department of Anatomy and Neurobiology, University of Maryland, School of Medicine.

PUBLICATIONS (Recent 5 years):

1. Taylor, J.W., Rivera, E.C., Kim, S., Campbell, R., Summerscales, R.L., **Kwon. H.J**. Machine Learning Analysis for non-linear phenolic compound monitoring using a mobile phone based ECL sensor, *Sensors*, 2021. DOI:10.3390/s21186004.

2. Rivera, E.C., Taylor, J.W., Summerscales, R.L., **Kwon, H.J**. Quenching Behavior of the Electrochemiluminescence of $Ru(bpy)_3^{2+}$/TPrA System by Phenols on a Smartphone-Based Sensor**,** *ChemistryOpen* 2021, *10*, 842. DOI: 10.1002/open.202100151

3. Rivera E.C., Summerscales R.L., Uppala P.P.T., **Kwon H.**J. Electrochemiluminescence mechanisms investigated with smartphone-based sensor data modeling, parameter estimation and sensitivity analysis. *ChemistryOpen*, 2020, doi.org/10.1002/open.202000165

4. **Hyun Kwon**, Elmer Ccopa Rivera, Jonathan Swerdlow, Rodney Summerscales, Padma Uppala, Rubens Maciel Filho, Mabio Neto, Development of smartphone-based ECL sensor for dopamine detection: Practical approaches, Results in Chemistry, 2020, vol. 2, 100029; DOI:10.1016/j.rechem.2020.100029

5. Elmer Ccopa Rivera, Jonathan Swerdlow, Rodney Summerscales, Padma Uppala, Rubens Maciel Filho, Mabio Neto, **Hyun Kwon**, Data-driven modeling of smartphone-based electrochemiluminescence sensor data using artificial intelligence, Sensors, **2020**, *20*(3), 625; DOI:10.3390/s20030625

6. Celina K. Yamakawa, Elmer Ccopa Rivera, **Hyun Kwon**, William E. Herrera Agudelo, Marcelo B.W. Saad, Jairo Leal, Carlos E.V. Rossell, Antonio Bonomi, Rubens Maciel Filho, Study of influence of yeast cells treatment on sugarcane ethanol fermentation: Operating conditions and kinetics, Biochemical Engineering Journal (BEJ), v. 147,p. 1-10, 2019; DOI:10.1016/j.bej.2019.03.022

PRESENTATIONS (recent 5 years):

1. Taylor J, Kwon H, Rivera E, Summerscales R., Electrochemiluminescence detection of phenolic compounds., MASAL, Michigan, March 12 , 2021.
2. Elmer Rivera, Mr. Jonathan Swerdlow, Adriano Pinto Mariano, Mr. Mabio Ramos Coelho Neto, Dr. Rodney Summerscales, Dr. Padma Uppala and Dr. **Hyun Kwon**, ILLUPHENS: Smartphone-based electrochemiluminescence sensor to monitor phenolic compounds in wastewater from biofuel plants, 42nd Symposium on Biomaterials, Fuels and Chemicals, April 26-29, 2020New Orleans, LA, USA
3. **Hyun Kwon**, Padma Tadi Uppala, Elmer C. Rivera, Mabio R. Neto, Daniel Marsh, Jonathan Swerdlow, Rodeny Summerscales, Development of a smartphone based electrochemiluminescence biosensor for dopamine detection in advanced breast cancer, AACR Annual Meeting April 24029, 2020 in San Diego, California
4. Elmer Alberto Ccopa Rivera, Nicholas Navarro, Jaymes Carson, Jonathan Swerdlow, Adriano Pinto Mariano, Mr. Mabio Ramos Coelho Neto, Dr. Rodney Summerscales, Padma Uppala and **Hyun Kwon**, A novel approach to model ECL reaction mechanisms with the aid of machine learning, MASAL, March 13, MI, 2020.
5. Elmer Rivera, Jonathan Swerdlow, Adriano Pinto Mariano, Mabio Ramos Coelho Neto, Rodney Summerscales, Padma Uppala and **Hyun Kwon,** ILLUPHENS: Smartphone-based electrochemiluminescence sensor to monitor phenolic compounds in wastewater from biofuel plants, 42nd Symposium on Biomaterials, Fuels and Chemicals, New Orleans, LA, April 26-29 , 2020.
6. **Hyun Kwon**, Elmer Rivera, Mabio Neto, Jonathan Swerdlow, Rodney Summerscales, Padma Uppla, Cancer Biomarker Detection Using the Smartphone Based ECL Immunosensor, Annual Meeting of Biomedical Engineers Society (BMES), Oct 17-19, Philladelphia, PA, 2019.
7. **Hyun Kwon**, Padma Tadi-Uppala, Elmer Rivera, Rodney Summerscales, Development of a cell phone-based electrochemiluminescence biosensor to detect breast cancer biomarkers , American Association for Cancer Research (AACR), #1636, Atlanta, GA, March 29-April 5, 2019.
8. Jonathan Swerdlow, Rodney Summerscales, **Hyun Kwon**, Developing mobile application for electrochemiluminescent biosensor control and analysis, MASAL, March 6, 2019.
9. Jeremy Barrett, Carlos Germosen, Rodney Summerscales, Daniel March**, Hyun Kwon**, Elmer Rivera, Mobile Phone based ECL sensor for dopamine detection, MASAL, March 6, 2019.
10. Daniel Marsh and **Hyun Kwon**, Mobile technology based ECL instrumentation, American Institute for Chemical Engineers (AICHE), Oct 28-Nov. 2, Pittsburgh, 2018.
11. Daniel Marsh, Ester Carrasco, Jisu Choi, and **Hyun Kwon**, Development and Configuration of Mobile-Phone based ECL Biosensor using [Ru(bpy)3]2+ and DBAE", MASAL2017, Western Michigan University, March 2nd, 2017.
12. Hyun Kwon, Daniel Marsh, "Signal Enhancement of Electro-chemi-luminescent Sensor with Mobile Phones", ASME 2017 International Design Engineering Technical Conference. Cleveland Convention Center, Cleveland, OH, Aug. 6-9, 2017

13. Hyun Kwon, "Design Focused Engineering Outreach Program" ASME 2017 International Design Engineering Technical Conference. Cleveland Convention Center, Cleveland, OH, Aug. 6-9, 2017.
14. Michael Hess and **Hyun Kwon**. Simulation of fluid and structure interaction for design of pressure–progressing spray fitting apparatus. MASAL 2016.
15. **Kwon HJ**, Web publication utilized as a communication tool for first year engineering students, annual conference of ASEE, New Orleans, LA, 2016.
16. Daniel Marsh, Jisu Choi, and **Hyun Kwon.** Instrumentation Strategy for Mobile Phone Based ECL Biosensor, MW BME conference, Champaign, IL, Nov. 4, 2016.
17. Ester Carrasco and **Hyun Kwon**, ECL Biosensor Signal Detection via Mobile Phone for Minimal Instrumentation, MW BME conference, Champaign, IL, Nov. 4, 2016.
18. **Kwon HJ**, Novel fluid channel design for paper based biosensors. **ASME 2015 International Mechanical Engineering Congress & Exposition,** Houston, TX, Nov. 13-19, 2015.
19. Rufaro Musvosvi and **Kwon HJ.** Development of the Labview Interface for Thorlabs™ Optical Trapping Kit Data Collection and Control" **ASME 2015 International Mechanical Engineering Congress & Exposition,** Houston, TX, Nov. 13-19, 2015.
20. **Kwon HJ**, Novel fluid channel design for paper based biosensors. **ASME 2015 International Mechanical Engineering Congress & Exposition,** Houston, TX, Nov. 13-19, 2015.
21. Rufaro Musvosvi and **Kwon HJ.** Development of the Labview Interface for Thorlabs™ Optical Trapping Kit Data Collection and Control" **ASME 2015 International Mechanical Engineering Congress & Exposition,** Houston, TX, Nov. 13-19, 2015.
22. Michael Hess and **Kwon HJ**. Prototyping to Validate the Design of Pressure-Progressing Spray Fitting Apparatus. **ASME 2015 International Mechanical Engineering Congress & Exposition,** Houston, TX, Nov. 13-19, 2015.
23. **Kwon HJ**, Mathematical models of protein interactions in the QCM-D biosensor for fractal surfaces, MASAL, Berrien Springs, MI, 2015.

AWARDS AND HONORS (RECENT 5 YEARS)

- NSF SUMMER INSTITUTE FELLOWSHIP AWARD, short course on muiltiscale Soft Mateirals, May NSF CBET Nan-Biosensing Division, " Artificial Intelligence based Optimization of Electrochemiluminescence sensor for Pointe of Care Applications" ($445,000) Pending
- NSF CBET Nano-biosensing division award: ECL biosensor with mobile technologies (as a PI, $250,000) 7/1/2017-6/31/2020
- Innovative Teaching and Learning Grant ($1,000), Implementation of Artificial Intelligence Assisted Design for Engineering Capstone Project Class, July 1, 2019-June 30, 2020 Andrews University Center for Teaching and Learning.
- Google IgniteCS grant: as a faculty advisor 2017 ($3,000)
- FRG 20192020 ($5,000), ANDREWS UNIVERSITY Renewal project "Development of ECL biosensor with mobile technologies" ($5000)
- FRG17-18 renewal ($5000) ANDREWS UNIVERSITY Renewal project "Development of ECL biosensor with mobile technologies" ($5000)

- FRG 16-17: ANDREWS UNIVERSITY, research project on “Development of ECL biosensor with mobile technologies” ($5,000)
- FRG 15-16: ANDREWS UNIVERSITY, research project on “Paper diagnostics and Mobile app development ($10,000) with collaboration with Dr. Rodney Summerscales.
- FRG 13-14: ANDREWS UNIVERSITY, RESEARCH PROJECT ON “Study of conformational and electric charge change of protein binding using the QCM-D and EGFET system” ($5,000)
- FRG 12-13: ANDREWS UNIVERSITY, RESEARCH PROJECT ON “FET based biosensor for characterization for DNA hybridization” (Renewed $5,000)”
- NSF SUMMER INSTITUTE FELLOWSHIP AWARD, short course on multi-scale soft Materials, May 9-12, NSF, 2010 ($2,000 and accommodation)
- NSF SUMMER INSTITUTE FELLOWSHIP AWARD, short course on multi-scale science based-modeling and simulation and experimental validation on enabling materials, NSF, 2009 ($2,000 and accommodation)