

## Curriculum Vitae

# Hyoun-Arm Joung

### PhD/ Postdoctoral Scholar

Department of Electrical Engineering, University of California, Los Angeles (UCLA)  
420 Westwood Plaza Room 14-128C, Engineering IV Building, UCLA Los Angeles, CA 90095  
Cell: +1-213-322-8929  
E-mail: [ammy2002@ucla.edu](mailto:ammy2002@ucla.edu), [hajoung0317@gmail.com](mailto:hajoung0317@gmail.com)

### Education

09/2011 – 08/2015	Department of Physics and Photon Science, Gwangju Institute of Science and Technology (Ph.D.)	Gwangju, Korea
03/2005 – 02/2007	Department of Chemical Engineering, Chungnam National University (M.S.)	Deajeon, Korea
03/1998 – 02/2005	Department of Chemical Engineering, Chungnam National University (B.S.)	Deajeon, Korea

### Work experience

03/2016 – Present	<b>Postdoctoral Scholar</b> Department of Electrical Engineering, University of California, Los Angeles (UCLA)
09/2015 – 02/2016	<b>Research Fellow</b> Department of Chemistry, Gwangju Institute of Science and Technology
08/2010 – 08/2011	<b>Post-Master Researcher</b> Bio-monitoring Center, Korea Research Institute of Bioscience and Biotechnology,
02/2010 – 05/2010	<b>Research Manager</b> R&D Biosensor 3, Infopia Co., Ltd.
03/2008 – 02/2010	<b>Assistant Manager</b> R&D Biosensor 3, Infopia Co., Ltd.
02/2007 – 02/2008	<b>Researcher</b> R&D Biosensor 3, Infopia Co., Ltd.
03/2005 – 02/2007	<b>Research Assistant</b> , University and Institute Cooperation Program, Korea Research Institute of Bioscience and Biotechnology

### Research experience

#### **Point-of-care diagnostic sensor**

Microfluidic paper based analytical devices ( $\mu$ PADs)  
Lateral flow immunoassay (or immunochromatographic assay) strip sensor  
Design and fabrication of simple and low-cost POC device

#### **Assay platforms**

Colorimetric assay platforms based on enzyme reaction and nanoparticles  
Simple assay platforms based on fluorescence, chemiluminescence, FRET and CRET  
Integration of assay platforms with POC biosensor  
Assay design for highly sensitive, simultaneous and homogenous measurement.

#### **Optical biosensors & biochip technology**

Surface plasmon resonance (SRP) and localized surface plasmon resonance (LSPR)  
Solid substrates and nanoparticles surface modification for biomolecules measurement  
Protein and DNA microarray

#### **Commercialization of mobile cholesterol monitoring system**

Sensor structural design  
Analysis and calibration algorithm design  
FDA/CE/KFDA certification

Establishment of production facility

### **Honors and Awards (Selected)**

08/2015	<b>Outstanding Research Awards</b> Gwangju Institute of Science and Technology
09/2011 –08/2015	<b>Government Scholarship</b> Gwangju Institute of Science and Technology
09/2013	<b>Scholarship for Excellence Student</b> Global University Project, Gwangju Institute of Science and Technology
09/2012	<b>Scholarship for Excellence Student</b> Global University Project, Gwangju Institute of Science and Technology
03/2009	<b>Annual Awards for Outstanding Staff</b> Infopia Co., Ltd.
04/2004	<b>Prize for Excellence</b> The 3 <sup>rd</sup> College Students Chemical Engineering Contest, <i>The Korean Institute of Chemical Engineers, 2004, Spring Meeting</i> , April, 23-24, Gongju
02/2004	<b>Scholarship for Outstanding Student</b> Chungnam National University

### **Refereed journal publications (\*Contributed equally)**

1. **Hyou-Arm Joung**<sup>\*</sup>, Youngung Seok<sup>\*</sup>, Ju-Young Byun, Hyo-sung Jeon, Su Jeong Shin, Hyung Soo Han, Min-Gon Kim, “Integration of loop-mediated isothermal amplification with paper -based diagnostic device for detection of multiple target DNAs”, In preparation.
2. **Hyou-Arm Joung**<sup>\*</sup>, Kahee Kim<sup>\*</sup>, Gyeo-Re Han, Min-Gon Kim, “An immunochromatographic biosensor combined with a water-swellaible polymer for automatic signal generation or amplification”, *Biosensors and Bioelectronics*, **2016**, 85, 422-428.
3. **Hyou-Arm Joung**<sup>\*</sup>, Cheng Guo Li<sup>\*</sup>, Hyungrye Noh, Moon-Bum Song, Min-Gon Kim, Hyungil Jung, “One-touch activated blood multi-diagnostic system via minimally-invasive hollow microneedle integrated with paper-based sensor”, *Lab on a Chip*, **2015**, 15(16), 3261–3414.
4. **Hyou-Arm Joung**<sup>\*</sup>, Dong-Gu Hong<sup>\*</sup>, Do Young Lee, Sang-Hyo Kim, Min-Gon Kim, “Attomolar detection of cytokines using a chemiluminescence immunoassay based on an antibody-arrayed CMOS image sensor”, *Sensors & Actuators: B. Chemical.*, **2015**, 221, 1248-1255.
5. **Hyou-Arm Joung**<sup>\*</sup>, Moon-Bum Song<sup>\*</sup>, Young Kyoung Oh, Kwonyoung Jung, Young Deok Ahn, Min-Gon Kim, “Tear-off patterning: Simple method for patterning nitrocellulose membranes to improve performance of point-of-care diagnostic biosensors”, *Lab on a Chip*, **2015**, 15, 3006-3012.
6. **Hyou-Arm Joung**<sup>\*</sup>, Young Kyoung Oh<sup>\*</sup>, Hyung Soo Han, Ho-Jun Suk, Min-Gon Kim, “A three-line lateral flow assay strip for the measurement of C-reactive protein covering a broad physiological concentration range in human sera”, *Biosensors and Bioelectronics*, **2014**, 61, 285-289.
7. Won-Bo Shim, Hyoyoung Mun, **Hyo-Arm Joung**, Jack Appiah Ofori, Duck-Hwa Chung, Min-Gon Kim, “Chemiluminescence competitive aptamer assay for the detection of aflatoxin B1 in corn samples”, *Food Control*, **2014**, 36, 30-35.
8. Md. Rajibul Akanda, **Hyou-Arm Joung**, Vellaiappillai Tamilavan, Seonhwa Park, Sinyoung Kim, Myung Ho Hyun, Min-Gon Kim, Haesik Yang, “An interference-free and rapid electrochemical lateral-flow immunoassay for one-step ultrasensitive detection with serum”, *Analyst*, **2014**, 139, 1420-1425.
9. Hyoyoung Mun, Eun-Jung Jo, Taihua Li, **Hyou-Arm Joung**, Dong-Gu Hong, Won-Bo Shim, Cheulhee Jung, Min-Gon Kim, “Homogeneous Assay of Target Molecules Based on chemiluminescence Resonance Energy Transfer (CRET) Using DNAzyme-linked Aptamers”, *Biosensors and Bioelectronics*, **2014**, 58, 308-314.
10. **Hyou-Arm Joung**, Young Kyoung Oh, Min-Gon Kim, “An automatic enzyme immunoassay based on a chemiluminescent lateral flow immunosensor”, *Biosensors and Bioelectronics*, **2014**, 53, 330-335.
11. **Hyou-Arm Joung**<sup>\*</sup>, Young Kyoung Oh<sup>\*</sup>, Sanghyo Kim, Min-Gon Kim, “Vertical flow immunoassay (VFA) biosensor for a rapid one-step immunoassay”, *Lab on a Chip*, **2013**, 13, 768-772.
12. Joon Seok Lee, **Hyou-Arm Joung**, Min-Gon Kim, and Chan Beum Park, “Graphene-based chemiluminescence resonance energy transfer for homogeneous immunoassay”, *ACS Nano*, **2012**, 6, 2978-2983.
13. **Hyou-Arm Joung**<sup>\*</sup>, Nae-Rym Lee<sup>\*</sup>, Seok Ki Lee, Junhyoung Ahn, Yong Beom Shin, Ho-Suk Choi, Chang-Soo Lee, Sanghyo Kim, Min-Gon Kim, “High sensitivity detection of 16s rRNA using peptide nucleic acid probes and a surface plasmon resonance biosensor”, *Analytica Chimica Acta*, **2008**, 630, 168-

173.

14. Jungki Ryu, **Hyou-Arm Joung**, Min-Gon Kim, Chan Beum Park, “Surface plasmon resonance analysis of Alzheimer’s  $\beta$ -Amyloid aggregation on a solid surface: from monomers to fully-grown fibrils”, *Analytical Chemistry*, **2008**, 80, 2400-2407.
15. Sang-Woo Kim, Min-Gon Kim, **Hyo-Am Jung**, Kyung-Hee Lee, Hyun-Sook Lee, Hyeon-Su Ro, “An application of protein microarray in the screening of monoclonal antibodies against the oyster mushroom spherical virus”, *Analytical Biochemistry*, **2008**, 374, 313–317.
16. **Hyou-Arm Joung**\*, Kyung-Ho Lee\*, Jin-Ho Ahn, Kyeong-Ohn Kim, In-Seok Oh, Yong-Beom Shin, Min-Gon Kim, Dong-Myung Kim, “Real-time monitoring of cell-free protein synthesis on a surface plasmon resonance chip”, *Analytical Biochemistry*, **2007**, 36, 170-174.
17. **Hyou-Arm Joung**, Won-Bo Shim, Duck-Hwa Chung, Junhyoung Ahn, Bong Hyun Chung, Ho-Suk Chio, Sang-Do Ha, Keun-Sung Kim, Kyu-Ho Lee, Cheol-Ho Kim, Kwang-Yup Kim, Min-Gon Kim, “Screening of a specific monoclonal antibody against and detection of *Listeria monocytogenes* whole cells using a surface plasmon resonance biosensor”, *Biotechnology and Bioprocess Engineering*, **2007**, 12, 80-85.
18. Eun-Ju Jeong, Kyoungsook Park, **Hyou-Arm Joung**, Chang-Soo Lee, Dai-Wu Seol, Bong Hyun Chung, Moonil Kim, “Detection of glucose-induced conformational change in hexokinase II using fluorescence complementation assay”, *Biotechnology Letters*, **2007**, 29, 797-802.
19. **Hyou-Arm Joung**, Ho-Suk Choi, Min-Gon Kim, “DNA microarray technology for detection of food-borne pathogens”, *Safe Food*, **2006**, 1(4), 24-30.
20. Moonil Kim, Sun Ok Jung, Kyoungsook Park, Eun-Ju Jeong, **Hyou-Arm Joung**, Tae-Hyoung Kim, Dai-Wu Seol, Bong Hyun Chung, “Detection of Bax protein conformational change using a surface plasmon resonance imaging-based antibody chip”, *Biochemical and Biophysical Research Communications*, **2005**, 338, 1834-1838.

### **Non-refereed publications**

1. **Hyou-Arm Joung**, Dong-Gu Hong, and Min-Gon Kim, “A high sensitivity chemiluminescence-based CMOS image biosensor for the detection of human interleukin 5 (IL-5)”, *IEEE Sensors*, **2012**.
2. Dong-Gu Hong, **Hyou-Arm Joung**, Sang-Hyo Kim, Min-Gon Kim, “High-sensitivity chemiluminescence detection of cytokines using an antibody-immobilized CMOS image sensor.”, *SPIE 2013 Nano-Bio Sensing, Imaging & Spectroscopy*, **2013**.

### **Talks and conference presentations**

1. **Hyou-Arm Joung**, Min-Gon Kim, “Development of chemiluminescence based lateral flow assay (LFA) strip biosensor using automatic delayed release by asymmetric membrane”, *Biosensors*, **2014**, Melbourne, Australia.
2. **Hyou-Arm Joung**, Dong-Gu Hong, and Min-Gon Kim, “A high sensitivity chemiluminescence-based CMOS image biosensor for the detection of human interleukin 5 (IL-5)”, **2012 IEEE Sensors annual meeting**, Taipei, Taiwan.
3. Dong-Gu Hong, **Hyou-Arm Joung**, Sang-Hyo Kim, Min-Gon Kim, “High-sensitivity chemiluminescence detection of cytokines using an antibody-immobilized CMOS image sensor”, *SPIE 2013 SPIE Nano-Bio Sensing, Imaging & Spectroscopy*, Jeju-do, Korea.
4. Won-Bo Shim, Hyoyoung Mun, **Hyo-Arm Joung**, Duck-Hwa Chung, Min-Gon Kim, “Chemiluminescence competitive assay for the detection of aflatoxin B1 in corn using an aptamer linked with gemin/G-quadruplex horseradish peroxidase-mimicking DNAzyme.”, **2013 IAFP Annual Meeting**, Charlotte, North Carolina, U.S.A..
5. Hyoyoung Mun, Eun-Jung Jo, **Hyo-Arm Joung**, Donggu Hong, Taihwa Li, Won-Bo Shim, Min-Gon Kim, “The smart DNA-based chemiluminescence resonance energy transfer (CRET) for the detection of ochratoxin A in coffee”, **2013 IAFP Annual Meeting**, Charlotte, North Carolina, U.S.A..
6. **Hyou-Arm Joung**, Mun-Bum Song, Min-Gon Kim, “Development of rapid and simple nitrocellulose membrane patterning method to fabricate NC-based point-of-care (POC) diagnostic devices”, *The Korean Society for Biotechnology and Bioengineering 2015 Spring meeting*, April 15-17, Yeosu.
7. **Hyou-Arm Joung**, Min-Gon Kim, “One-step chemiluminescence measurement strategy for lateral flow assay (LFA) strip biosensor.” *The Korean BioChip Society 2014 Spring Meeting*, April 2-4, Jeju-Do.
8. **Hyou-Arm Joung**, Young Kyoung Oh and Min-Gon Kim, “A one-step chemiluminescence lateral flow assay (CLFA) by substrates delayed-release technique using an asymmetric membrane”, *The Korean BioChip Society 2012 Fall Meeting*, October 18-19, Gwangju
9. **Hyou-Arm Joung**, Jun-Hyoung Ahn, Bong Hyun Chung, Ho Suk Choi, Min-Gon Kim, “Comparison of the detection sensitivity between angular interrogation- and intensity measurement-based SPR biosensors”,

- The Korean Society for Biotechnology and Bioengineering 2005 Fall meeting*, October 27-29, Seoul.
10. **Hyou-Arm Joung**, In-Kyung Kim, Jun-Hyoung Ahn, Yong-Beom Shin, Bong Hyun Chung, Ho Suk Choi, Min-Gon Kim, "Microarray-based analysis of 16s rRNAs for the detection of food-borne pathogens", *The Korean Society for Biotechnology and Bioengineering 2005 Spring meeting*, April 15-16, Chuncheon .
  11. **Hyou-Arm Joung**, Yong-Beom Shin, Bong Hyun Chung, Uk Yeol Moon, Serka Kim, Min-Gon Kim, "Surface plasmon resonance (SPR) detection of *Escherichia coli* 16s rRNA by interaction with oligonucleotides probes immobilized on three different modified surface", *The Korean Society for Biotechnology and Bioengineering 2004 Fall meeting*, October 13-15, Cheongju.
  12. Youngkyoung Oh, **Hyou-Arm Joung**, Min-Gon Kim, "A flow-through-hole (FTH) biosensor for Highly rapid and one-step immunoassay", *The Korean Society for Biotechnology and Bioengineering 2012 Fall meeting*, April 11-13, Changwon.
  13. Youngkyoung Oh, **Hyou-Arm Joung**, Eun Jung Jo, Min-Gon Kim, "Development of rapid immunoassay system: flow through hole(FTH) sensor to measure high-sensitivity C-reactive protein (hs-CRP)", *The Korean Society for Biotechnology and Bioengineering 2011 Spring meeting*, April 14-16, Jeju-do.
  14. Kahee Kim, **Hyou-Arm Joung**, Min-Gon Kim, "One-step Signal enhancement for lateral flow immunoassay strip sensor by delayed release of chloroauric acid", *The Korean BioChip Society 2014 Spring Meeting*, April 2-4, Jeju-Do.
  15. Seok Ki Lee, Dong Hwan Choi, **Hyou-Arm Joung**, Nae-Rym Lee, Jun Hyoung Ahn, Bong Hyun Chung, Yong-Beom Shin, Min-Gon Kim, "Discriminatory rapid detection of food-borne bacterial 16S rDNA amplicon using fluorescent labeled colony (FLC)-PCR based oligonucleotide microarrays", *The Korean Society for Biotechnology and Bioengineering 2008 Spring meeting*, April 18-19, Jeonju.
  16. Jungki Ryu, **Hyou-Arm Joung**, Min-Gon Kim, Chan Beum Park, "Surface plasmon resonance analysis of template-directed self-assembly and deposition of Alzheimer's  $\beta$ -amyloid", *The Korean Society for Biotechnology and Bioengineering 2007 Spring meeting*, April 26-28, Incheon.
  17. Moonil Kim, Sun Ok Jung, Kyoungsook Park, Eun-Ju Jeong, **Hyou-Arm Joung**, Tae-Hyoung Kim, Dai-Wu Seol, Bong-Hyun Chung, "Detection of conformational change of protein using surface plasmon resonance (SPR) imaging system", *The Korean Society for Biotechnology and Bioengineering 2005 Fall meeting*, October 27-29, Seoul.
  18. In-Kyung Kim, **Hyou-Arm Joung**, Jun-Hyoung Ahn, Bong Hyun Chung, Min-Gon Kim, "16r ribosomal RNA detection of food-borne pathogenic microorganisms using surface plasmon resonance biosensor", *The Korean Society for Biotechnology and Bioengineering 2005 Spring meeting*, April 15-16, Chuncheon .

### **Registered patents**

1. Apparatus and method for measuring biomedical data using algorithm for improving reproducibility, US 9307937 (2016.04.12).
2. Apparatus and method for measuring biomedical data and measurement strip, US 8883086 (2014.11.11).
3. Test strip and method for measuring blood cholesterol level using the same, US 8377684 (2013.02.19).
4. Test strip designed to improve spreadability of blood, US 8293189 (2012.10.23).
5. Device for collecting sample, US 8221703 (2012.07.17).
6. Biosensor, US 8158080 (2012.04.17).
7. Sample collection and injection device, US D665075 (2010.10.05).
8. Sampling/sample-injecting apparatus and biodata-measuring set comprising same, EP 02439540 (2015.01.24).
9. High-sensitivity biosensor using pixel analyses of a CMOS image, KR 10-1359379 (2014.01.29).
10. A method of producing membrane sensor for changing the condition of reaction sequentially with one injection of sample, KR 10-1394221 (2014.05.07).
11. A method of producing membrane sensor for multiple diagnoses using screen printing, KR 10-1471932 (2014.12.05).
12. Method for preparing multi-functional biomolecular conjugates using two kinds of particle and multi-functional biomolecular conjugates prepared therefrom, KR 10-1444424 (2014.09.18).
13. An electrode on a membrane by printing and its application to the detection of biomaterials, KR 10-1335246 (2013.11.25).
14. Biosensor, KR 10-1175853 (2012.08.14).
15. Improved applicator and measurement strip set comprising the same, KR 10-1204299 (2012.11.19).
16. Membrane biosensor attached with porous film and method for detecting immune reaction or enzyme reaction using the same, KR 10-1271022 (2013.05.29).
17. Biomedical data measuring device, method for determining error on physiological data measuring device, storage medium recording program therein, KR 10-1128279 (2012.03.13).
18. Device for collecting body fluid, KR 10-1147534 (2012.05.14).

19. Apparatus, method and test strip for multi-testing, KR 10-1148769 (2012.05.16).
20. Apparatus and method for bio-test with algorithm for improving reproducibility, KR 10-1100620 (2011.12.23).
21. Biosensor, KR 10-1110561 (2012.01.20).
22. Test strip improved spreadability strip of plasma or serum, KR 10-1203385 (2012.11.15).
23. Test strip and cholesterol measuring method, KR 10-1058743 (2011.08.17).