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RESEARCH INTEREST

BioMEMS

- Microactuator (micropump, microvalve)
- LOC (Lab-on-a-chip)
- Polymer microfabrication
- Flexible microdevice

Microfluidics

- Electrokinetic phenomena in microfluidics
- Acoustofluidic phenomena in microfluidics
- Mass-transport/thermal phenomena in microfluidics

Microfluidics application for biology/chemistry

- Biophysics/biochemistry research using microfluidics
- Biomolecule analysis for clinical diagnostics
- Impedimetric and optical biomolecule detection methods

EDUCATION AND RESEARCH TRAINING

Postdoctoral Scholar, 2012, UC Berkeley

Research topic: "Microfluidic Western Blotting"

Research advisor: Prof. Amy E. Herr

Postdoctoral Scholar, 2009, Center for Embedded Networked Sensing, UCLA

Research topic: "Micromachined Nitrate Sensor using Total Internal Reflection in a Microchannel"

Research advisor: Prof. Jack W. Judy

Ph. D. UCLA, 2008, Electrical Engineering Department

Dissertation topic: "Micromachined Chronocoulometric Nitrate Sensor and Parallel-Plate Donnan-Dialytic Sample-Preparation System using Anion-Exchange Membrane", Dissertation advisor: Prof. Jack W. Judy

M. S. Sogang University, 2001, Department of Mechanical Engineering

Thesis topic: "Research on Auto Feed Rate Control of Milling Processes by Fuzzy Control of Spindle Motor Currents", Thesis Advisor: Prof. Doyoung Jeon

B. S. Sogang University, 1999, Department of Mechanical Engineering (Cum Laude)

APPOINTMENTS

2021-present **Professor**, Department of Mechanical Engineering, Myongji University

2019-2020 **Visiting Associate Professor**, Department of Mechanical Engineering, Johns Hopkins University (Prof. Claire S. Hur)

2016-2021 **Associate Professor**, Department of Mechanical Engineering, Myongji University

2012-2016 **Assistant Professor**, Department of Mechanical Engineering, Myongji University

2009-2012	Postdoctoral Scholar , <i>California Institute for Quantitative Biosciences, UC Berkeley</i>
2008-2009	Postdoctoral Scholar , <i>Center for Embedded Networked Sensing, UCLA</i>
2002-2008	Research Assistant , <i>Electrical Engineering Department, UCLA</i>
1999-2001	Research Assistant , <i>Department of Mechanical Engineering, Sogang University</i>

PUBLICATIONS

Peer Reviewed Journals:

- Hyun Namgung, Abdi Mirgissa Kaba, Hyeonkyu Oh, Hyunjin Jeon, Jeonghwan Yoon, Haseul Lee and Dohyun Kim, "Quantitative Determination of 3D-printing and Surface-treatment Conditions for Direct-printed Microfluidic Devices", *Biochip Journal* (Impact Factor 4.229), vol. 16, Feb. 2022, pp. 82-98.
- Nebiyu Getachew Arega, Whitney N. Heard, Nguyen Anh Nhung Tran, Sukyo Jung, Jianyun Meng, Minsub Chung, Moon-Soo Kim, and Dohyun Kim, "Zinc-finger-protein-based Microfluidic Electrophoretic Mobility Reversal Assay for Quantitative Double-stranded DNA Analysis", *Biochip Journal* (Impact Factor 4.229), vol. 15, Nov. 2021, pp. 381-395 (*Cover article*)
- Abdi Mirgissa Kaba, Hyunjin Jeon, Areum Park, Kyungjin Yi, Seonhyuk Baek, Aeja Park, and Dohyun Kim, "Cavitation-microstreaming-based Lysis and DNA Extraction using a Laser-machined Polycarbonate Microfluidic Chip", *Sensors & Actuators: B. Chemical* (Impact Factor 9.221), vol. 346, Nov. 2021, pp.130511
- Jiyoung Shim, Langley Williams, Dohyun Kim, Kisung Ko, and Moon-Soo Kim, "Application of engineered zinc finger proteins immobilized on paramagnetic beads for multiplexed detection of pathogenic DNA", *Journal of Microbiology and Biotechnology* (Impact Factor 3.227), vol. 31, Sep. 2021, pp. 1-7
- Srivathsan Kalyan, Corinna Torabi, Harrison Khoo, Hyun Woo Sung, Sung-Eun Choi, Wenzhao Wang, Benjamin Treutler, Dohyun Kim, Soojung Claire Hur, "Inertial Microfluidics Enabling Clinical Research", *Micromachines* (Impact Factor 3.523), vol. 12, Mar. 2021, 257.
- Hyunjin Jeon, Kaba Abdi Mirgissa, Seonhyuk Baek, Kyehan Rhee, and Dohyun Kim, "Excitation-Frequency Determination Based on Electromechanical Impedance Spectroscopy for a Laser-Microfabricated Cavitation Microstreaming Micromixer", *Sensors & Actuators: A. Physical* (Impact Factor 4.291), vol. 326, Apr. 2021, pp. 112730.
- Minh Khang Chau, Nebiyu Getachew Arega, Nguyen Anh Nhung Tran, Jin Song, Sangmin Lee, Jintae Kim, Minsub Chung, and Dohyun Kim, "Single-point, Multianalyte, Label-free Contactless Conductivity Detection for Microfluidic Isoelectric Focusing ", *Analytical Chimica Acta* (Impact Factor 6.911), vol. 1125, Mar. 2020, pp. 60-70.
- Hakhyun Kim, Heewon Hwang, Seonhyeok Baek, and Dohyun Kim, "Design, Fabrication, and Performance Evaluation of a Printed-circuit-board Microfluidic Electrolytic Pump for Lab-on-a-chip Devices", *Sensors & Actuators: A. Physical* (Impact Factor 4.291), vol. 277, July 2018, pp. 73-84.
- Yeji Kim, Kyung Joo Song, Jintae Kim, Minsub Chung, and Dohyun Kim, "Single Amino Acid Replacement transforms mCherry to a Far-red fluorescence protein", *Biotechnology and Bioprocess Engineering* (Impact Factor: 3.386), vol. 21, Jan. 2017, pp. 720-725.
- Jin Song, Minsub Chung, and Dohyun Kim, "Microfluidic ice generation and freezing of biological solution using water-based evaporative cooling of atomized microdroplets", *Review of Scientific Instruments* (Impact Factor: 1.843), vol. 86, Jan. 2015, pp. 016103.
- Minsub Chung, Dohyun Kim*, and Amy E. Herr, "Polymer sieving matrices in microanalytical electrophoresis", *Analyst* (Impact Factor: 5.227), vol. 139, Aug. 2014, pp. 5636-5655 (*Two authors equally contributed).

12. Dohyun Kim, and Jack W. Judy, "Analysis of Donnan-dialyzer irreproducibility and experimental study of a microfluidic parallel-plate membrane-separation module for total analysis systems", *Journal of Membrane Science* (Impact Factor: 10.53), vol. 460, June 2014, pp. 148–159.
13. Jeong Byung Chae, Jun O Kwon, Ji Sun Yang, Dohyun Kim, Kyeihan Rhee, Sang Kug Chung, "Optimum thickness of hydrophobic layer for operating voltage reduction in EWOD systems", *Sensors and Actuators A: Physical* (Impact Factor: 4.291), vol. 215, Aug 2014, pp. 8–16.
14. Dohyun Kim, and Amy E. Herr, "Protein Immobilization Techniques for Microfluidic Assays", *Biomicrofluidics* (Impact Factor: 3.258), vol. 7, July 2013, pp. 041501.1-47 (*cited 382 times*)
15. Minsub Chung, Dohyun Kim, and Amy E. Herr, "Microchamber Western Blotting using Poly-L-Lysine Conjugated Polyacrylamide Gel for Blotting of SDS coated proteins", *Analytical Chemistry* (Impact Factor: 6.986), vol. 85, Aug. 2013, pp. 7753–7761.
16. Dohyun Kim, Kelly Karns, Samuel Q. Tia, Mei He, and Amy E. Herr, "Electrostatic Protein Immobilization Using Charged Polyacrylamide Gels and Cationic Detergent Microfluidic Western Blotting", *Analytical Chemistry* (Impact Factor: 8.008), vol. 84, Mar. 2012, pp. 2533–2540.
17. Samuel Tia, Mei He, Dohyun Kim, and Amy E. Herr, "Multi-analyte On-Chip Native Western Blotting", *Analytical Chemistry* (Impact Factor: 8.008), vol. 83, May 2011, pp. 3581-3588.
18. Dohyun Kim, Ira B. Goldberg, and Jack W. Judy, "Micromachined Electrochemical Nitrate Sensor using Double-potential-step Chronocoulometry", *Sensors and Actuators B* (Impact Factor: 9.221), vol. 135, Jan. 2009, pp. 618–624.
19. Dohyun Kim, Ira B. Goldberg, and Jack W. Judy, "Chronocoulometric Determination of Nitrate on Silver Electrode and Sodium Hydroxide Electrolyte", *Analyst* (Impact Factor: 5.227), vol. 132, No. 4, Apr. 2007, pp. 350-357.
20. Dohyun Kim, Do Hyeon Son, and Doyoung Jeon, "Feed-system autotuning of a CNC Machining Center: Rapid System Identification and Fine Gain Tuning Based on Optimal Search", *Precision Engineering* (Impact Factor: 3.315), vol. 36, Apr. 2012, pp. 339– 348.
21. Dohyun Kim, and Doyoung Jeon, "Fuzzy-Logic Control of Cutting Forces in CNC Milling Processes and Comparison of Feed and Spindle Motor Currents as an Indirect Force Sensor", *Precision Engineering* (Impact Factor: 3.315), vol. 35, Jan. 2011, pp. 143–152.
22. Usob Lee, Dohyun Kim, Namkeon Hur and Doyoung Jeon, "Design Analysis and Experimental Evaluation of an MR Fluid Clutch", *Journal of Intelligent Material Systems and Structures* (Impact Factor: 2.774), vol. 10, No. 9, Sep. 1999, pp. 701-707.

Peer Reviewed Journals (in preparation):

1. Kaba Abdi Mirgissa, Woongsub Lee and Dohyun Kim, "Rapid Prototyping of High-aspect-ratio Sub-100- μ M PMMA Microfluidic Devices: Optimization of CO₂ Laser Machining and Solvent-assisted Thermal Bonding", *Sensors & Actuators: A. Physical* (Impact Factor 4.291)
2. Seonhyeok Baek, Hakhyun Kim, Heewon Hwang, Junhee Lee, and Dohyun Kim, "A Tape-liner-supported-laser-micromachined PCB Electrolytic Micropump Using an Oil-based Electrolyte-Separation Barrier", *Biochip Journal* (Impact Factor 4.229).

Peer Reviewed International Conference Proceedings:

1. Sukyo Joung, Dohyun Kim, Jintae Kim, and Minsub Chung, "Microscale Formation of Immobilized pH Gradient in Simple Straight Channel", MicroTAS 2019, Basel, Switzerland, Oct. 27-31, 2019

2. Kaba Abdi Mirgissa, Hyunjin Jeon, and Dohyun Kim, "A Microfluidic Cavitation-Microstreaming DNA Extractor", MicroTAS 2019, Basel, Switzerland, Oct. 27-31, 2019
3. Hyunjin Jeon, Kaba Abdi Mirgissa, and Dohyun Kim, "Impedance-based Excitation-frequency Optimization for a Transfer-tape-supported Laser-micromachined Cavitation-microstreaming Micromixer", MicroTAS 2019, Basel, Switzerland, Oct. 27-31, 2019
4. Kaba Abdi Mirgissa, Woongsub Lee, and Dohyun Kim, "Toward Rapid Prototyping of High-Aspect-Ratio Sub-100- μ M PMMA Microfluidic Devices: Optimization of CO₂ Laser Machining and Solvent-Assisted Thermal Bonding", IEEE MEMS 2019, Seoul, Korea, Jan. 27-31, 2018
5. Minh Khang Chau, Nebiyu Getachew Arega, Jin Song, Hwajin Lee, Jintae Kim, Minsub Chung, and Dohyun Kim, "Quantitative and Multi-Species Determination of Isoelectric-Focused-Proteins Using Single-Point Microfluidic Contactless Conductivity Detection", MicroTAS 2018, Kaohsiung, Taiwan, Nov. 11-15, 2018
6. Seonhyeok Baek, Hakhyun Kim, Heewon Hwang, Junhee Lee, and Dohyun Kim, "A Tape-backing-supported-Laser-micromachined PCB Electrolytic Micropump Using an Oil-based Electrolyte-separation Barrier", MicroTAS 2018, Kaohsiung, Taiwan, Oct. 11-15, 2018
7. Nebiyu Getachew Arega, Whitney N. Heard, Moon-Soo Kim, and Dohyun Kim, "Zinc-Finger-Protein-Based Rapid Microfluidic Homogenous Electrophoresis Affinity Assay For Quantitative Gene Analysis", MicroTAS 2017, Savannah, USA, Oct. 22-26, 2017.
8. Hakhyun Kim, Heewon Hwang, Jongwon Kim, and Dohyun Kim, "An Electrolytic Micropump Fabricated On Printed Circuit Board For Integrated Microfluidic System", MicroTAS 2017, Savannah, USA, Oct. 22-26, 2017.
9. Nebiyu Getachew Arega, Jin Song, Kyung Joo Song, Jintae Kim, Minsub Chung, and Dohyun Kim, "Contactless Conductivity Detection Of Proteins For Microfluidic Isoelectric Focusing", 2016 MicroTAS, Dublin, Ireland, Oct. 9-13, 2016.
10. Jin Song, Minsub Chung, and Dohyun Kim, "Evaporation-cooling-based Microfluidic Temperature Control And Ice Generation", 2014 MicroTAS, San Antonio, TX, Oct. 26-30, 2014.
11. Samuel Q. Tia, Alex J. Hughes, Kelly Karns, M. Kursad Araz, Mei He, Dohyun Kim and Amy E. Herr, "Towards Next-Generation Proteomic Assays: Functional Materials as Sieving Matrices and Binding Scaffolds", 2011 MRS Fall Meeting, Boston, MA, Nov. 28-Dec. 2, 2011, Vol. 1415, mrsf11-1415-ii06-05, doi:10.1557/opl.2011.1537
12. Dohyun Kim, Samuel Q. Tia, Mei He, and Amy E. Herr, "Microfluidic Western Blotting: Cationic Surfactant Based Protein Sizing Integrated With Electrostatic Immobilization", the 24th International Conference on Micro Electro Mechanical Systems, MEMS 2011, Cancun, Mexico, January 23 - 27, 2011, p. 197-200.
13. Samuel Q. Tia, Mei He, Dohyun Kim, and Amy E. Herr, "On-chip Multi-analyte Far Western Blotting In Two Minutes", *Proceedings of The 14th International Conference on Miniaturized Systems for Chemistry and Life Sciences*, Groningen, Netherlands, October 3-7, 2010, p. 731-733.
14. Dohyun Kim, Ira B. Goldberg, and Jack W. Judy, "Micromachined Amperometric Nitrate Sensor with an Anion Permeable Membrane", *the 206th Meeting of The Electrochemical Society, Chemical Sensors VI: Chemical and Biological Sensors and Analytical Methods*, Honolulu, Hawaii, Oct. 3-8, 2004, p. 223-231.
15. Dohyun Kim, Ira B. Goldberg, and Jack W. Judy, "Micromachined Amperometric Nitrate Sensor with Integrated Microfluidics", *Hilton Head 2004: A Solid State Sensor, Actuator and Microsystems Workshop*, Hilton Head Island, South Carolina, June 6-10, 2004, p. 97-98.
16. Usob Lee, Dohyun Kim, Namkeon Hur and Doyoung Jeon, "Design analysis and experimental evaluation

of an MR fluid clutch", *Proceedings of the 7th International Conference on Electro-Rheological Fluids and Magneto-Rheological Suspensions*, Honolulu, Hawaii, July 19-23, p. 674-681

Peer Reviewed Domestic Conference Proceedings:

1. Hyun Namgung, Abdi Mirgissa Kaba, Hyeonkyu Oh, Hyunjin Jeon, and Dohyun Kim, " Quantitative Determination of 3D Printing and Surface Treatment Conditions for Direct-printed Microfluidic Devices", *The Korean KMEMS Spring Conference 2022*, Jeju, Korea, Apr. 6-8, 2022
2. Seonhyeok Baek, Hakhyun Kim, Heewon Hwang, Junhee Lee, Abdi Mirgissa Kaba, Hyunjin Jeon, and Dohyun Kim, "Oil-plug electrolysis micropump fabricated with PCB and tape-based laser machining", *The Korean KMEMS Spring Conference 2022*, Jeju, Korea, Apr. 6-8, 2022
3. Dohyun Kim, Kelly Karns, Samuel Q. Tia, Mei He, and Amy E. Herr, "Electrostatic Protein Immobilization Gel for Microfluidic Western Blotting", *The Korean MEMS conference 2012*, Jeju, Korea, Apr. 5-7, 2012, p.1-2.
4. Dong-Uk Seo, Do-Hyun Kim, and Doyoung Jeon, "Tool Monitoring of a CNC Machining Center Using The Wavelet Transform", *Proceedings of the Korean Society of Precision Engineering Annual Meeting*, Suwon, Korea, Oct. 28, 2000, p. 148-152.
5. Do-Hyun Kim and Doyoung Jeon, "Research on the Auto Feedrate Control of Milling Processes by Fuzzy Control of Spindle Motor Currents", *Proceedings of the Korean Society of Mechanical Engineering Annual Meeting, Dynamics and Control*, Muju, Korea, July 13-14, 2000, p. 396-401.
6. Do-Hyun Kim and Doyoung Jeon, "Research on the Auto Feedrate Control of Milling Process by the Fuzzy Control of Motor Currents", *Proceedings of the Korean Society of Precision Engineering Annual Meeting*, Pusan, Korea, May 13, 2000, Vol. 2, p. 708-713.

RESEARCH GRANT AWARD

1. 3D dPCR

Sponsor: Samsung Future Technology Foundation

Funding: 330,000,000 Korean Won/year

Role: Principal Investigator

2. Ultra-rapid microfluidic nucleic-acid preparation and amplification based on sharp-edge acoustic streaming and photothermal temperature cycling (2022-present)

Sponsor: National Research Foundation

Funding: 100,000,000 Korean Won/year

Role: Principal Investigator

3. Acoustic microstreaming micromixer based on ultra-thin elastomeric membrane oscillator (2021-2022)

Sponsor: National Research Foundation

Funding: 50,000,000 Korean Won/year

Role: Principal Investigator

4. Skin phantom simulating a capillary network of wrist (2021-2021)

Sponsor: Samsung Electronics

Funding: 104,500,000 Korean Won/year

Role: Principal Investigator

5. A contactless-conductivity biomolecular analysis platform based on supercharged bioconjugates and microfluidic mobility shift assay (2019-2022)

Sponsor: National Research Foundation

Funding: 50,000,000 Korean Won/year

Role: Principal Investigator

6. Microfluidic DNA extraction cartridge based on cavitation microstreaming (2018-2019)

Sponsor: The Ministry of SMEs and Startups

Funding: 40,000,000 Korean Won/year

Role: Principal Investigator

7. Chemically-writable Multi-level/Multi-cell Memory using Protein (2016-2019)

Sponsor: Samsung Future Technology Foundation

Funding: 144,000,000 Korean Won/year

Role: Co-principal Investigator

8. Contactless conductivity detection and microchip electrophoresis for development of a high-performance, portable biomolecular analysis system (2016-2019)

Sponsor: National Research Foundation

Funding: 50,000,000 Korean Won/year

Role: Principal Investigator

9. Development of CMOS/MEMS hybrid biosensor array platform (2015-2018)

Sponsor: Ministry of Trade, Industry, and Energy

Funding: 80,000,000 Korean Won/year

Role: Co-Principal Investigator

10. Next-generation versatile microfluidic platform for biomolecular analysis based on hybrid mass transfer and maskless gel patterning (2014-2017)

Sponsor: National Research Foundation

Funding: 50,000,000 Korean Won/year

Role: Principal Investigator

11. Microfluidic Freeze Using Evaporative Cooling of Microdroplets (2014-2015)

Sponsor: Myongji University Research Grant

Funding: 5,000,000 Korean Won

Role: Principal Investigator

12. Protein-based Nanofluidic Flash Memory (2014-2016)

Sponsor: Samsung Future Technology Foundation, Contract #: SRFC-IT1401-07

Funding: 200,000,000 Korean Won

Role: Co-principal Investigator

13. Laboratory Instrument Grant (2014)

Sponsor: Ministry of Science, ICT & Future Planning

Funding: 20,000,000 Korean Won

Role: Principal Investigator

14. The Integration of in-situ Electrochemical Microsensor Arrays to Enable the Reliable Electrodeposition of Complex Metal Alloys in Microsystems (2008-2009)

Sponsor: DARPA Microsystems Technology Office-Wide BAA 09-25, Contract #: W31P4Q-10-C-009

Funding: \$300,000.00, PI: Trevor Niblock, Magzor Corporation (www.magzor.com)

Role: 45% Ph.D.-level engineer, provided an initial concept of electrochemical elemental sensors for magnetic alloy plating, and wrote all the technical contents of the proposal.

PATENTS

Registered:

1. Minsub Chung, Sangmin Lee, Hwajin Lee, Tran Nguyen Anh Nhung, Dohyun Kim, Nebiyu Getachew Arega, Minh Khang Chau, "Protein memory cell and protein memory system", US Patent # US 11,152,082
2. Dohyun Kim, Jin Song, and Nebiyu Getachew Arega, "Single Point Detection Type Microfluidic Isoelectric Focusing Assay and Chips Using The Same", US Patent # US 10,620,157
3. Dohyun Kim, Jin Song, Jintae Kim, Minsub Chung, Kyungju Song, Yeji Kim, "Nonvolatile protein memory system with optical write/erase and electrical readout capability", US Patent # US 10,403,360
4. Amy E. Herr and Dohyun Kim, "Multi-Directional Microfluidic Devices Comprising a Pan-Capture Binding Region and Methods of Using the Same", US Patent # US 8,921,123
5. Samuel Tia, Amy E. Herr, Mei He, and Dohyun Kim, "Microfluidic Devices and Methods for Assaying a Fluid Sample Using the Same", US Patent # US 9,841,417
6. 김도현, 송진, 김이연, "미립화된 수용액 방울의 증발냉각을 이용한 미소유체 냉각장치", 등록번호 10-1787407
7. 김도현, 송진, 김진태, 정민섭, 송경주, 김예지, "광학적 쓰기/지우기와 전기적 읽기가 가능한 비휘발성 단백질 메모리 시스템", 등록번호 10-1985920
8. 김도현, 송진, 네비유 아레가 게타츄, "단일 지점 검출 방식 미소유체 등전점 전기영동 및 미소유체 칩", 출원번호 10-2064388
9. 김도현, 김학현, 황희원, "미세 유동 장치 및 미세 유동 장치용 칩과 이를 이용한 미세 유동 장치의 제조 방법", 출원번호 10-2018-0055590
10. 김도현, 전현진, "미소유체 교반기 및 미소유체 교반기 제조 방법", 출원번호 10-2018-0055596
11. 김도현, 전현진, 압디카마머기사, "추출 카트리지를, 추출 장치 및 이를 구비하는 추출 키트", 등록번호 10-2281087

Applied:

1. 정민섭, 이상민, 이화진, 트란 응옌 앤 뇡, 김도현, 네비유 아레 가 게타츄, 민강차우, "단백질 메모리 셀 및 단백질 메모리 시스템", 출원번호 10-2020-0006084
2. 윤인호, 김도현, 김영현, 카마 압디 머기사, 윤정환, "웨어러블 장치의 심박 센서의 성능을 검증하기 위한 전자 장치 및 그의 동작 방법", 출원번호 10-2022-0037487

PRESENTATION

Conferences:

1. Boseok Heo, Hyun Namgung, Abdi Mirgissa Kaba, and Dohyun Kim, "Adhesive Bonding of 3D-printed Microfluidic Chip and PMMA Coverslip", The KSME 2022 Fall Conference, Jeju, Korea, Nov. 9-11 (Poster)
2. Jintae Kim, Hyun Namgung, Abdi M. Kaba, and Dohyun Kim, "3D-printed Sharp-edge Acoustic Microfluidic Mixer", The KSME 2022 Fall Conference, Jeju, Korea, Nov. 9-11 (Poster)
3. Heeyeon Kim, Abdi M. Kaba, Hyun Namgung, and Dohyun Kim, "Fabrication and Characterization of Ultra-Thin PDMS Membrane Using Polystyrene Petri Dish", The KSME 2022 Fall Conference, Jeju, Korea, Nov. 9-11 (Poster)
4. Jianyun Meng, Nebiyu Getachew Arega, and Dohyun Kim, "Numerical-simulation-based selection of microchip electrophoresis buffer for contactless conductivity detection", The BioChip 2022 Spring Conference, Busan, Korea, May 18-20 (Poster)
5. Hyun Namgung, Abdi Mirgissa Kaba, Hyeonkyu Oh, Hyunjin Jeon, and Dohyun Kim, "Optimization of

- 3D-printing and surface-treatment conditions for microfluidic devices by quantitative measurement of optical quality", The KMEMS 2022 Spring Conference, Jeju, Korea, April 6-8 (Poster)
6. Seonhyeok Baek, Hakhyun Kim, Heewon Hwang, Junhee Lee, Abdi Mirgissa Kaba, Hyunjin Jeon, and Dohyun Kim, "Oil-plug electrolysis micropump fabricated with PCB and tape-based laser machining", The KMEMS 2022 Spring Conference, Jeju, Korea, April 6-8 (Poster)
 7. Abdi Mirgissa Kaba, Hyunjin Jeon, Sowon Moon, Seonhyeok Baek, and Dohyun Kim, "Cavitation-microstreaming-based Microfluidic Lysis and DNA-extraction Device", The BioChip 2021 Spring conference, Hongcheon, Korea, June 16-18 (Poster)
 8. Hyun Namgung, Abdi Mirgissa Kaba, Hyeonkyu Oh, Hyunjin Jeon, and Dohyun Kim, "Quantitative Determination of 3D-printing and Surface-treatment Conditions for Direct-printed Microfluidic Devices", The BioChip 2021 Spring conference, Hongcheon, Korea, June 16-18 (Poster)
 9. Seonhyeok Baek, Hakhyun Kim, Heewon Hwang, Junhee Lee, Abdi Mirgissa Kaba, Hyunjin Jeon, and Dohyun Kim, "Advances in a PCB Electrolytic Micropump with Oil Separation Barrier", The BioChip 2020 fall conference, Jeju, Korea, Nov. 25-27 (Poster)
 10. Abdi Mirgissa Kaba, Hyunjin Jeon, Sowon Moon, Seonhyeok Baek, and Dohyun Kim, "Microfluidic DNA Extraction Device Based On Cavitation Microstreaming", The BioChip 2020 fall conference, Jeju, Korea, Nov. 25-27 (Poster)
 11. Nebiyu Getachew Arega, Nguyen Anh Nhung Tran, Minsub Chung, Moon-Soo Kim, and Dohyun Kim, "Zinc-finger-protein-based Rapid Microfluidic Electrophoretic Mobility Reversal Assay For Quantitative Gene Analysis", The BioChip 2020 fall conference, Jeju, Korea, Nov. 25-27 (Poster)
 12. Hyeonkyu Oh, Kaba Abdi Mirgissa, Hyunjin Jeon, and Dohyun Kim, "A 3D-printed Cavitation-microstreaming micromixer", The KSPE 2019 Fall conference, Changwon, Korea, October 29-31 (Poster)
 13. Hyunjin Jeon, Kye-Han Rhee, and Dohyun Kim, "Performance Optimization of A Laser-machined Micromixer Based on Cavitation Microstreaming Using High-speed Flow Visualization", The BioChip 2018 fall conference, Jeju, Korea, Nov. 7-9 (Poster)
 14. Abdi Mirgissa Kaba, Woongsub Lee, and Dohyun Kim, "Optimization of CO₂-Laser Machining and Solvent-assisted Thermal Bonding of PMMA for a High-aspect-ratio Sub-100- μ m Microfluidic Channel", The BioChip 2018 fall conference, Jeju, Korea, Nov. 7-9 (Poster)
 15. Hyunjin Jeon and Dohyun Kim, " Visualization of Cavitation Microstreaming in the Laser-machined PMMA Microfluidic Mixer", The KSPE 2018 spring conference, Jeju, Korea, May 9-11 (Poster)
 16. Seonhyuk Baek, Hakhyun Kim, Heewon Hwang, Junhee Lee, and Dohyun Kim, "Printed-circuit-board Electrolytic Micropump using Oil-based Electrolyte-separation Barrier", The KSPE 2018 spring conference, Jeju, Korea, May 9-11 (Poster)
 17. Hyunjin Jeon, and Dohyun Kim, "Precision laser machined microfluidic mixer based on cavitation microstreaming", The KSPE 2017 Spring Meeting, Jeju, Korea, May 18-19 (Poster)
 18. Hakhyun Kim, Heewon Hwang, and Dohyun Kim, " An electrolytic micropump using interdigitated electrode fabricated on a printed circuit board", The KSPE 2017 Spring Meeting, Jeju, Korea, May 18-19 (Poster)
 19. Barnabas Kim, Dohyun Kim, and Moon-Soo Kim, "Utilizing zinc finger proteins and beads for detection of pathogen-specific DNA sequence", The annual meeting of Kentucky Academy of Science, Louisville, KY, USA, Nov. 4-5 (Poster)
 20. Hakhyun Kim, Hyunjin Jeon, and Dohyun Kim, "A micropump based on electrolysis of sodium sulfate", The 2016 KSME Micro/Nano Engineering Meeting, Busan, Korea, May 19-20 (Poster)

21. Jin Song, Saro Chhorn, Kyung Joo Song, Jintae Kim, Minsub Chung, and Dohyun Kim, "Noninvasive conductivity detection of proteins for microchip isoelectric focusing", The 2015 Biochip Conference Fall Meeting, Hongchun, Korea, Nov.19-20 (Poster)
22. Jin Song, and Dohyun Kim, "Microfluidic freezer of biological solution using water-based evaporative cooling of atomized microdroplets", The 2014 Biochip Conference Fall Meeting, Osong, Korea. Sept.30-Oct.2 (Poster).
23. Jin Song, and Dohyun Kim, "Integrated microfluidic temperature control and ice generation using evaporation cooling", The 2014 KSME Bioengineering Division Spring Meeting, Kyungjoo, Korea. Apr. 9-11 (Poster).
24. Dong Hee Lee, Jin Song, Sung Yub Kim, Seongu Cho, Min Hyeok Kim, Woo Jin Jung, Sung Jin Cho, Kyo Sun Kim, Hee Ho Lee, Yi Yeon Kim, Sang Baek Lee, and Dohyun Kim, "A high-throughput, semi-automated, \$1500 hot-embossing machine for replication of thermoplastic microfluidic devices", The 2013 Biochip Conference, Chuncheon, Korea, Nov. 13-14, 2013 (poster).
25. Dohyun Kim, Kelly Karns, Samuel Q. Tia, Mei He, and Amy E. Herr, "Cationic Detergent Microfluidic Western Blotting Integrated with Electrostatic Protein Immobilization", *The 2012 UC Systemwide Bioengineering Conference*, Berkeley, June 21-23, 2012 (Poster).
26. Dohyun Kim, Kelly Karns, Samuel Q. Tia, Mei He, and Amy E. Herr, "Electrostatic Protein Immobilization Gel for Microfluidic Western Blotting", *The Korean MEMS conference 2012*, Jeju, South Korea, Apr. 5-7, 2012 (Oral).
27. Samuel Q. Tia, Alex J. Hughes, Kelly Karns, M. Kursad Araz, Mei He, Dohyun Kim and Amy E. Herr, "Towards Next-Generation Proteomic Assays: Functional Materials as Sieving Matrices and Binding Scaffolds", *2011 MRS Fall Meeting*, Boston, MA, Nov. 28-Dec. 2, 2011 (Oral).
28. Dohyun Kim, Kelly Karns, Samuel Q. Tia, Mei He, and Amy E. Herr, "Cationic Detergent Microfluidic Western Blotting of Proteins: Molecular-weight-based Separation, Electrostatic Immobilization, and Retention of Native Activity", *the 36th Federation of Analytical Chemistry and Spectroscopy Societies Conference*, Reno, NV, USA, Oct 2 -7, 2011 (Oral).
29. Samuel Q. Tia, Dohyun Kim, Mei He, and Amy E. Herr, "Multi-analyte native Western blotting", *Gordon-Kenan Research Seminar (GRS)*, Waterville Valley, NH, June 25-26, 2011 (Oral)
30. Dohyun Kim, Samuel Q. Tia, Mei He, and Amy E. Herr, "Microfluidic Western Blotting: Cationic Surfactant Based Protein Sizing Integrated With Electrostatic Immobilization", *the 24th International Conference on Micro Electro Mechanical Systems, MEMS 2011*, Cancun, Mexico, January 23 - 27, 2011 (Oral).
31. Samuel Q. Tia, Mei He, Dohyun Kim, and Amy E. Herr, "On-chip Multi-analyte Far Western Blotting In Two Minutes", *Proceedings of The 14th International Conference on Miniaturized Systems for Chemistry and Life Sciences*, Groningen, Netherlands, October 3-7, 2010 (Oral).
32. Dohyun Kim, Ira B. Goldberg, and Jack W. Judy, "Micromachined Amperometric Nitrate Sensor with an Anion Permeable Membrane", *the 206th Meeting of The Electrochemical Society, Chemical Sensors VI: Chemical and Biological Sensors and Analytical Methods*, Honolulu, Hawaii, Oct. 3-8, 2004 (Oral).
33. Dohyun Kim, Ira B. Goldberg, and Jack W. Judy, "Micromachined Amperometric Nitrate Sensor with Integrated Microfluidics", *Hilton Head 2004: A Solid State Sensor, Actuator and Microsystems Workshop*, Hilton Head Island, South Carolina, June 6-10, 2004 (Oral).
34. Dong-Uk Seo, Do-Hyun Kim, and Doyoung Jeon, "Tool Monitoring of a CNC Machining Center Using The Wavelet Transform", *Korean Society of Precision Engineering Annual Meeting*, Suwon, Korea, Oct. 28, 2000 (Poster).

35. Do-Hyun Kim and Doyoung Jeon, "Research on the Auto Feedrate Control of Milling Processes by Fuzzy Control of Spindle Motor Currents", *Korean Society of Mechanical Engineering Annual Meeting, Dynamics and Control*, Muju, Korea, July 13-14, 2000 (Oral).
36. Do-Hyun Kim and Doyoung Jeon, "Research on the Auto Feedrate Control of Milling Process by the Fuzzy Control of Motor Currents", *Korean Society of Precision Engineering Annual Meeting*, Pusan, Korea, May 13, 2000 (Oral).
37. Usob Lee, Dohyun Kim, Namkeon Hur and Doyoung Jeon, "Design analysis and experimental evaluation of an MR fluid clutch", *Proceedings of the 7th International Conference on Electro-Rheological Fluids and Magneto-Rheological Suspensions*, Honolulu, Hawaii, July 19-23, 1999 (Poster).

JOURNAL REVIEW

International Journal of Precision Engineering and Manufacturing
 Electrophoresis
 Biomicrofluidics
 Micro and Nano Systems Letters
 KSME Journal Series C

TECHNICAL SERVICE

Technical Program Committee, *The Korean MEMS conference* 2012, 2013, 2015, 2016, 2019
 Education Committee, *The Korean Society of Mechanical Engineers*, 2021
 Public Relation Committee, *Korean Biochip Society* 2018, 2019, 2020, 2021
 Planning Committee, *Korean Biochip Society* 2016, 2017
 Information Committee, *The Society of Micro and Nano Systems*, 2020, 2021
 International Committee, *MicroNano System Society* 2018, 2019
 Chief Financial Officer, *Biomedical Engineering Society for Circulation*, 2016, 2017

INVITED TALK

1. "Microfluidic Electrophoresis and Functional Polyacrylamide Gel for High-performance Biomolecular Separation and Detection", Department of Molecular Science and Technology, Ajou University, Suwon, Sep. 20, 2022
2. "Application of cavitation microstreaming-based microfluidic mixing to DNA extraction", 2022 Symposium for the Society of Micro and Nano Systems local chapter (Gyeonggi-Incheon-Kangwon-Jeju), Myongji University, Yongin, Korea, August 26, 2022
3. "Application of cavitation microstreaming-based microfluidic mixing to DNA extraction", BIT Convergence Research Center, Hallym University, Chuncheon, Korea, June 20, 2022
4. "Summary of Recent Research Activities in BNML", Inventage Lab Inc., Seongnam, Korea, June 23, 2021
5. "Recent Research Activities in the BNML, Myongji University", The Hur Lab, Mechanical Engineering Department, Johns Hopkins University, Baltimore, USA, Sep. 10, 2019
6. "Recent Research Activities in the BNML, Myongji University", The New Technology Forum, Micro Nano Systems Society, Ansan, Korea, Dec. 7, 2018
7. "Research Activity in the BNML, Myongji University", The Annual Research Review of Mechanical Engineering Department, Sogang University, Seoul, Korea, Dec. 6, 2018
8. "Toward integrated microfluidics: a PCB-based electrolytic micropump and cavitation-

- microstreaming micromixer”, The KSBB International Academia/Industry Joint Meeting, Seoul, Korea, Oct. 11, 2018
9. “PCB-based Electrolytic Micropump and Cavitation-microstreaming micromixer for Integrated Microfluidics”, Daegu Gyeongbuk Medical Innovation Foundation, Daegu, Korea, July 6, 2018
 10. “An abridged course on MEMS and Microfabrication”, Korea Semiconductor Industry Association (KISA), Seongnam, Korea, April 7, 2017
 11. “Multifunctional Photopatterned Polyacrylamide Gels for Microfluidic Protein Analysis”, 2014 Fall Meeting of Korean Rheology Society, Suwon, Korea, Nov. 11, 2014.
 12. “Quick Overview on Microfluidics and its Bioanalytical Application”, National NanoFab Center (NNFC), Korea Advanced Institute of Science and Technology (KAIST), Invited Lecture, Jan. 14, 2014.
 13. “Microfluidic protein analysis using microchamber geometry and charged polyacrylamide gel”, Department of Mechanical Engineering, Pohang Institute of Science and Technology, Department Seminar Series, Nov. 8, 2013.
 14. “Protein Detection on Chip: Microfluidic Western Blotting and Isotachopheresis”, The KSME 2012 Fall Annual Meeting, Changwon, Korea, Nov. 7-9, 2012).
 15. “Protein Detection on Chip: Microfluidic Western Blotting and Isotachopheresis”, Department of Mechanical Engineering, Myongji University, The 2nd Electrowetting Workshop, Nov. 8, 2013
 16. Department of Mechanical Engineering, Myongji University, Department Seminar Series, Nov. 28, 2012
 17. “Protein Detection on Chip: Microfluidic Western Blotting and Isotachopheresis”, College of Natural Science, Myongji University, Convergence Research Seminar Series, Nov. 22, 2012
 18. “Integrated Sample Preparation, Separation, and Detection for Chemical and Biochemical Microsensor”, Korea Electronics Technology Institute, Technical Seminar, Apr. 30, 2012
 19. “Integrated Microfluidic Sample Purification, Enrichment, Separation, and Detection for Biochemical and Chemical Analysis”, Korea Institute of Science and Technology, Center for BioMicrosystems, Technical Seminar Series, Apr. 10, 2012
 20. “Microfluidic Western Blotting Platform for High-throughput, Low-sample-consuming, High-specificity Protein Detection”, Electronics and Telecommunications Research Institute, Technical Seminar, Jan. 11, 2012
 21. “Cationic Detergent Microfluidic Western Blotting Integrated with Electrostatic Protein Immobilization Gel”, Samsung Advanced Institute of Technology, Technical Seminar, Jan. 5, 2012
 22. “Cationic-detergent Microfluidic Western Blotting using Electrostatic Immobilization of Proteins”, Dongguk University, Department of Biomedical Engineering, Technical Seminar Class, Dec. 13, 2011
 23. “Microfluidic Western Blotting Integrated with Electrostatic Immobilization Gel”, Korea Institute of Science and Technology, Energy Mechanics Research Center, Technical Seminar Series, Dec. 12, 2011
 24. “Microfluidic Biochemical/Chemical Analysis Systems Integrated with Sample Preparation and Separation”, Sogang University, Department of Mechanical Engineering, Technical Seminar Class, Dec. 9, 2011
 25. “Microfluidic Biochemical/Chemical Analysis Systems Integrated with Sample Preparation and Separation”, Chung-ang University, Energy Safety Research Institute, Technical Symposia Series, Dec. 8, 2011
 26. “Micromachined Chronocoulometric Nitrate Sensor and Parallel-plate Donnan-dialytic Sample-

- preparation System Using Anion-exchange Membrane”, University of California, Los Angeles, Center for Embedded Network Sensing, Technical Seminar Series, Apr. 3, 2009
27. “A High-Performance Micromachined Amperometric Nitrate Sensor for Environmental Monitoring”, University of California, Los Angeles, The 2nd UCLA – Nagoya University Symposium on MEMS, Nano, and Bio Technologies, Jan. 18, 2008
28. “A High-Performance Micromachined Amperometric Nitrate Sensor for Environmental Monitoring”, University of California, Los Angeles, Center for Embedded Network Sensing, The 5th Annual Research Review, Oct. 10, 2007

TEACHING

Graduate Classes

- 2016-present **Introduction to MEMS and Micromachining**, Myongji University
- 2014-present **Introduction to BioMEMS**, Myongji University
- 2004 **Micromachining and MEMS Laboratory**, *UCLA*
- 1999 **Advanced Control Systems**, *Sogang University*

Undergraduate Classes

- 2021-present **Special Topics in Mechanical Engineering**, Myongji University
- 2018-present **Smart Sensor and Measurement Systems**, Myongji University
- 2016-present **Introduction to Mechanical Engineering**, Myongji University
- 2013-present **Mechanical Engineering Experiment**, Myongji University
- 2013-present **Capstone Design**, *Myongji University*
- 2013-2015 **Electrical Engineering for Mechanical Engineers**, *Myongji University*
- 2012-2013 **Creative Engineering Design**, *Myongji University*
- 2012-present **Engineering Mechanics: Statics**, *Myongji University*
- 2000 **Automatic Control Systems**, *Sogang University*

Graduate Students Advising

- 2021-present **Jayoung Koo**, A heat-sink design for a plasma generator
- 2020-present **Meng Jianyun**, A biomolecular conductometry based on supercharged bioconjugates
- 2020-2022 **Seonkyuk Baek**, PCB-based electrochemical micropump with an oil-separation barrier
- 2018-2021 **Hyunjin Jeon**, Cavitation-microstreaming-based microfluidic mixer
- 2018-2022 **Abdi Kaba Mirgissa**, Solvent-based bonding for microfluidic device fabrication
- 2017-2019 **Chau Minh Khang**, Microfluidic isoelectric focusing and noninvasive C4D detection
- 2016-2018 **Hakhyun Kim**, PCB-based electrochemical micropump
- 2015-2016 **Saro Chhorn**, Microfluidic isoelectric focusing and noninvasive C4D detection
- 2015-present **Nebiyu Getachew Arega**, Next-generation versatile microfluidic platform for biomolecular analysis based on hybrid mass transfer and maskless gel patterning
- 2014-2016 **Song Jin**, Microfluidic coolant-free cooler, protein flash memory
- 2008-2009 **Buddy Aswin**, UV spectrochemical analysis of nitrate
- 2005-2006 **Michael Glickman**, Wireless microcontroller-based chemical-sensor control board

Undergraduate Student Advising

2022-present **Jintae Kim**, 3D-printed sharp-edge micromixer
 2022-present **Bo Seok Heo**, Micro ultrasonic welding for microfluidics
 2022-present **Heeyeon Kim**, Ultra-thin PDMS membrane
 2021-present **Haseul Lee**, 3D printed PDMS mold
 2021-2022 **Jeonghwan Youn**, 3D-printed PDMS mold
 2020-2022 **Hyun Namgung**, Optimization of SLA 3D printing condition for a microfluidic chip
 2018-2021 **Hyeonkyu Oh**, 3D printed microfluidic mixer
 2018-2021 **Sowon Moon**, Embedded system for fluidic control
 2018-2018 **Woogsub Lee**, Solvent-assisted PMMA bonding
 2018-2020 **Seonkyuk Baek**, PCB-based electrochemical pump with an oil-separation barrier
 2018-2020 **Junhee Lee**, PCB-based electrochemical pump
 2016-2018 **Heewon Hwang**, PCB-based Microfluidic electrochemical pump
 2016-2018 **Hyunjin Jeon**, Cavitation-microstreaming-based microfluidic mixer
 2015-2016 **Hakhyun Kim**, Microfluidic electrochemical pump
 2015-2016 **Jaehyuk Lee**, Liquid metal thermally actuated valve
 2015-2016 **Hyunsik Lim**, Gold nanorod based microfluidic heater
 2013-2014 **Song Jin**, Microfluidic coolant-free cooler
 2013-2014 **Yiyeon Kim**, Flow-field measurement on a microfluidic chip
 2010-2011 **Byungsoo Min**, Bidirectional current measuring circuit for microchip electrophoresis

ALUMNI

Graduate Students

2022 **Abdi Kaba Mirgissa, Ph.D.** dissertation title "Optimized Laser Machining for High-resolution Thermoplastic Microfabrication and a Cavitation-microstreaming-based DNA Extraction Microdevice"
 2022 **Seonhyuk Baek, M.S.** dissertation title "Tape-supported Laser Micromachining and Performance Characterization of a PCB Electrolytic Micropump using an Oil-based Electrolytic Separation Barrier"
 2021 **Hyunjin Jeon, M.S.** dissertation title "Optimization of Excitation Frequency for a Laser-micromachined Acoustic Micromixer based on Impedance Spectroscopy"
 2019 **Chau Minh Khang, M.S.** dissertation title "Single-point Microfluidic Contactless Conductivity Detection for Quantitative, Multispecies, Isoelectric-focusing Protein Analysis"
 2018 **Hakhyun Kim, M.S.** dissertation title "Design, Fabrication and Performance Evaluation of a High-Performance electrolytic PCB Micropump for Pressure-source-integrated Lab-on-a-chip Device"
 2016 **Song Jin, M.S.** dissertation title "Evaporative Temperature Control and Noninvasive Conductivity Detection Method of Protein in a Lab-on-a-chip Device"

Undergraduate Students

2022 **Jeonghwan Youn, B.S.**
 2022 **Hyun Namgung, B.S.**
 2021 **Sowon Moon, B.S.**

2021	Hyeonkyu Oh, B.S.
2020	Junhee Lee, B.S.
2020	Seonkyuk Baek, B.S.
2019	Ung Seop Lee, B.S.
2018	Heewon Hwang, B.S.
2016	Hyun Sik Lim, B.S.
2016	Jae Hyuk Lee, B.S.
2013	Yiyeon Kim, B.S.
2013	Seo Woo Seok, B.S.

AWARDS / HONORS

Excellent Reviewer Award, Accreditation Board for Engineering Education of Korea (ABEEK), 2022
Excellent Poster Award, BioChip Conference, 2018
Excellent Poster Award, BioChip Conference, 2015
Excellent Course Portfolio Award, School of Engineering, Myongji University, 2015
Design Advisor Award, The 4th national student design competition, 2014
Excellent Course Portfolio Award, School of Engineering, Myongji University, 2014
Graduate Research Assistantship, UCLA, 2002-2008
Graduate Teaching Assistantship, UCLA, 2004
Rotary Ambassadorial Scholarship Award, Rotary Foundation, 2001
Department Chair Scholarship, Mechanical Engineering Department, Sogang University, 2000
Excellent Grades Scholarship, Sogang University, 1995, 1996

PROFESSIONAL MEMBERSHIPS

Member, Korean Society of Precision Engineering (KSPE)
Member, Korean Society of Mechanical Engineering (KSME)
Member, Korean Biochip Society (KBCS)
Member, MicroNano System Society