

## EDUCATION AND RESEARCH EXPERIENCES

*Mukesh Thapa, Post-Doctorate Fellow, Bio Design Institute, Arizona State University*

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<https://search.asu.edu/profile/5253430>

*Researcher in the field of Biomedical engineering, research especially in association with microfluidic, biosensor fabrication (point of care), and embryo culture systems.*

### EDUCATION

- Ph.D. Biomedical Engineering, (2023)  
School of Medicine, Department of Biomedical Engineering,  
Keimyung University, Daegu, South Korea
- M.Sc. Biotechnology, (2016)  
Central Department of Biotechnology,  
Tribhuvan University, Kathmandu, Nepal
- B.Sc. Microbiology, (2012)  
Tri-Chandra Multiple Campus,  
Tribhuvan University, Kathmandu, Nepal

### RESEARCH AND RESPONSIBILITIES

#### **During the post-doctoral appointment at BDI Biodesign, Center for Bioelectronics and biosensor, ASU**

- Evaluation of methodology and principles for optical biosensor of CART cells, cancer cytokines like IL6, IFN gamma, heart disease cytokines like NT-pro BNP
- Designing and fabrication of microfluidic chips as a platform for CART and blood cytokine biomarker detection
- Integration of sensor platform with inhouse designed optical detection platform
- Evaluation of overall detection system with hospital-generated actual blood samples.
- Write reports and grants.

#### **During the post-doctoral appointment at Mechanical Engineering Hongik University**

- Designing and fabrication of microfluidic chips with a concave cell culture platform
  - Mask Design drawing using CAD/Solid works.

- Fabrication of wafers (Different heights) using mask and photolithography techniques.
- Preparation of silicon-based PDMS chips using wafers.
- Mice handling
  - Preparation of female mice for embryo collection
  - Injection of necessary hormones
  - Mice mating
  - Collection of ampules from copulated female mice after killing
- Embryo culture
  - Preparation of embryo culture media
  - Selective collection of fertilized embryos from the collected ampulla of female mice.
  - Transfer the embryo to culture media.
  - Selective identification of blastocoel.
  - Microscopic analysis of embryos.
  - Molecular analysis of embryos.
- Identification of label-free techniques for insulin and glucose
- Fabrication of electrodes for measurement of insulin and glucose
- Conduct sensitivity, selectivity, efficiency, and stability tests of biosensors.
- Write a manuscript on all the experiments conducted in the laboratory.
- Assist and supervise undergraduate and graduate students to perform experiments related to embryos, biosensors, and microfluidics.
- Assist professor in writing research grants and project reports.

#### **During postdoc/Ph.D. appointment at Keimyung University**

- Designing and fabrication of different microfluidic PDMS chips with multiple-channel
- Flow itching of channels to form a wavy pattern.
- Identify label-free techniques for HbA1c, glucose, lactate, and glycated albumin.
- Fabrication of electrode for measurement of glucose and lactate together
- Prepare high-fat diet mice to generate variable samples for efficiency tests.
- Fabrication of electrode for HbA1c and glycated albumin measurement using boronic acid as selective bond.
- Fabrication of electrodes for measurement of HbA1c and glucose together using a common sample source.
- Conduct sensitivity, selectivity, efficiency, and stability tests of all the developed biosensors.
- Write a manuscript using data collected from experiments and assist in submitting and reviewing articles.

#### **During my appointment at the Nepal Agricultural Research Council**

- Molecular analysis of Fish around Nepal.
  - Extraction of DNA from fins of fish (silver carp, common carp)
  - Quantification of extracted DNA.
  - PCR for chromosomal analysis of Fish.
  - Statistical analysis of results.
- Fish Parasite infection treatment efficiency test.
- Infection of fishes (with respective parasites).
- Understand the treatment efficiency of medicine and herbs used by farmers.

- Also, the IC50 values of drugs and herbs should be calculated to understand health hazards.
- Statistical analysis of collected data and assistance on report writing.

#### **During my internship (at the Research Institute for Bioscience and Biotechnology)**

- Sample collection: oral samples like extracted teeth and scaling from dental clinics.
- Culture of samples on various bacterial and fungal culture plates
- Conduction of biochemical tests to identify the bacteria.
- Preparation of bacterial broth for organic extraction
- The organic extract produced by bacteria is collected using rotavapor.
- Prepare sample for Sequencing and GC-MS.
- Analysis of sequencing and GC-MS data.
- Write manuscripts and reports from acquired data.

### **PUBLICATIONS AS FIRST AUTHOR**

- **Mukesh Thapa**, Yun Seok Heo\* (2025), *Label-free Electrochemical Biosensor for Glycated Hemoglobin (HbA1c) and Glycated Albumin (GA) Measurement Using 4-mercapto-phenyl Boronic Acid Embedded Affinity*, **biochip Journal**, 1-14  
<https://link.springer.com/article/10.1007/s13206-025-00198-y>
- **Mukesh Thapa**, Yun Seok Heo\* (2023), *Label-free electrochemical detection of glucose and glycated hemoglobin (HbA1c)*, **Biosensors and Bioelectronics**, Volume 221, 2023, 114907, ISSN 0956-5663  
<https://www.sciencedirect.com/science/article/abs/pii/S0956566322009472>
- **Mukesh Thapa**, Sung, R.; Yun Seok Heo\* (2021), *A Dual Electrode Biosensor for Glucose and Lactate Measurement in Normal and Prolonged Obese Mice Using a Single Drop of Whole Blood*. **Biosensors**, page volume 11, 507  
<https://www.mdpi.com/2079-6374/11/12/507>
- **Mukesh Thapa\*** (2023), *Understanding blood glucose for healthcare monitoring*, **Austin J biosensor and bioelectronics**, volume 8(1), 1043 ISSN 2473-0629  
<https://austinpublishinggroup.com/biosensors-bioelectronics/fulltext/ajbb-v8-id1043.php>
- **Mukesh Thapa**, Yun Seok Heo\* (2025), *Palladium nano structure-based label-free electrochemical biosensors for HbA1c and insulin measurement*, **under review at Biosensor and Bioelectronics**,  
<https://track.authorhub.elsevier.com/?uuid=81005da4-9c89-453e-b684-71c5e26782d8>
- **Mukesh Thapa\***, Nirmal Panthi, Rajani Malla, Hari Datta Bhattarai, (2020), *Molecular and biochemical analysis of microorganisms isolated from oral samples of*

*diverse Nepalese population, Nepalese biotechnology society yearly journal*, volume 5, 32.

## Manuscripts under development

- **Mukesh Thapa**, Yun Seok Heo\* (2025), *Status and future prospective of electrochemical biosensors to manage overall complications of diabetes mellitus using a blood sample.*
- **Mukesh Thapa**, Seema Thapa, Yun Seok Heo\* (2025), *Development and evaluation of 3D micro-platforms for in vivo single and group embryo culture system.*
- **Mukesh Thapa**, **Sajuna Sunuwar**, Yun Seok Heo\*, *A highly stable and efficient oxidase biosensor with simple nanoparticle modification.*

## REFERENCES

- As a post-doctorate scholar at BDI Biodesign, Center for Bioelectronics and Biosensors  
**Professor. Shaopeng Wang** (Principal Advisor)  
Contact: +14807277081, [Shaopeng.wang@asu.edu](mailto:Shaopeng.wang@asu.edu)
- As a post-doctorate researcher and Ph.D. graduate at the Biomedical Engineering Department Keimyung University, Daegu, South Korea  
**Professor. Yun Seok Heo** (Principal Advisor)  
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Professor. Seon Chil Kim (Dissertation Examiner)  
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Professor: Jong Ha Lee (Dissertation Examiner)  
Contact: +821089688769, [segeberg@gmail.com](mailto:segeberg@gmail.com)
- As a Researcher at the Nepal Agricultural Research Center, Lalitpur, Nepal  
**Mrs. Neeta Pradhan** (supervisor scientist),  
Contact: +977-9841455083, [pradhannita@yahoo.com](mailto:pradhannita@yahoo.com)
- As an internship student at the Research Institute of Bioscience and Biotechnology, Lalitpur, Nepal  
**Professor. Hari D. Bhattarai** (Internship advisor)  
Contact: +977-9851172031, [hd.bhattarai@cdbtu.edu.np](mailto:hd.bhattarai@cdbtu.edu.np)
- As a master's graduate from Biotechnology department, Tribhuvan University, Kathmandu, Nepal  
**Professor. Rajani Malla** (Dissertation advisor)

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