

## Mahmoud Nady Abdelmoez

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### Education

#### *Ph.D.*

April 2016 – September 2019

Department of Micro Engineering, Kyoto University, Japan.

Thesis title: “*On-chip electrophoretic fractionation of cytoplasmic and nuclear RNA from single cells.*”

#### *M.Sc. in mechanical engineering*

December 2014

Department of Mechanical Engineering, Assiut University, Egypt

Thesis title: “*Optimization of thermal storage system integrated in a solar driven adsorption cooling system.*”

#### *B.Sc. in mechanical engineering*

September 2003 – August 2008

Department of Mechanical Engineering, Assiut University, Egypt

Cumulative GPA: “Excellent” (90.35%) equivalent to (4.0 GPA)

Title of graduation project: “*Study on the performance of radiation panels for air-conditioning applications.*”

### Publications

#### *Journal papers*

- 1- Mahmoud N. Abdelmoez, Yusuke Oguchi, Yuka Ozaki, Ryuji Yokokawa, Hidetoshi Kotera and Hirofumi Shintaku, " Distinct kinetics in electrophoretic extraction of cytoplasmic RNA from single cells." *Analytical Chemistry*, Vol. 92, No. 1 (2019):1485-1492.
- 2- 小口祐伴, マハムード ナディ アブデルモエズ, 新宅博文, SINC-seq: 1 細胞の核 RNA と細胞質 RNA の定量相関解析, 生物物理, Vol.59, No.2,(2019), pp.88-90.
- 3- Sangamithirai S. Parimalam, Yusuke Oguchi, Mahmoud N. Abdelmoez, Arata Tsuchida, Yuka Ozaki, Ryuji Yokokawa, Hidetoshi Kotera, and Hirofumi Shintaku. "Electrical lysis and RNA extraction from single cells fixed by dithio-bis (succinimidyl propionate)." *Analytical Chemistry*, Vol. 90, No. 21 (2018): 12512-12518.
- 4- Mahmoud N. Abdelmoez, Kei Iida, Yusuke Oguchi, Hidekazu Nishikii, Ryuji Yokokawa, Hidetoshi Kotera, Sotaro Uemura, Juan G. Santiago, and Hirofumi Shintaku. "SINC-seq: correlation of transient gene expressions between nucleus and cytoplasm reflects single-cell physiology." *Genome Biology*, Vol. 19, No. 1 (2018): 66.
- 5- Mahmoud N. Abdelmoez, Kei Iida, Yusuke Oguchi, Hidekazu Nishikii, Ryuji Yokokawa, Hidetoshi Kotera, Sotaro Uemura, Juan G. Santiago, and Hirofumi Shintaku. "Correlation of gene expressions between nucleus and cytoplasm reflects single-cell physiology." *bioRxiv* (2017): 206672.

#### *Conference presentations and posters*

- 1- Mahmoud N. Abdelmoez, Yusuke Oguchi, Yuka Ozaki, Ryuji Yokokawa, Hidetoshi Kotera and Hirofumi Shintaku, “Length bias-free extraction of cytoplasmic RNA from single cells by electrical lysis and electrophoresis,” *30th 2019 International Symposium on Micro-NanoMechatronics and Human Science*, Nagoya, Japan, 1st – 4th December (2019).
- 2- Mahmoud N. Abdelmoez, Yusuke Oguchi, Yuka Ozaki, Ryuji Yokokawa, Hidetoshi Kotera and

- Hirofumi Shintaku, "Dynamics of RNA in single cells under focused electric field," *the JSME annual meeting 2019*, Akita, Japan, 8th – 11th September (2019), J22109.
- 3- Mahmoud N. Abdelmoez, Yusuke Oguchi, Yuka Ozaki, Ryuji Yokokawa, Hidetoshi Kotera and Hirofumi Shintaku, "Dynamics of RNA extraction from single cells under focused electric field," *The EMBO Workshop on Single Cell Biology*, Tokyo, Japan, 20th – 22nd , May (2019).
  - 4- Mahmoud N. Abdelmoez, Yusuke Oguchi, Ryuji Yokokawa, Hidetoshi Kotera and Hirofumi Shintaku, "RNA extraction from single cells via focused electric field at a hydrodynamic trap in a microfluidic channel," *the EMBS Micro and Nanotechnology in Medicine Conference*, Koloa, HI, USA, 10th – 11th, December (2018).
  - 5- Mahmoud N. Abdelmoez, Ryuji Yokokawa, Hidetoshi Kotera and Hirofumi Shintaku, "Numerical analysis on single-cell electroporation and RNA extraction under focused electric field," *the JSME annual meeting 2018*, Suita, Osaka, Japan, 10th September (2018), J0530202.
  - 6- Mahmoud N. Abdelmoez, Kei Iida, Yusuke Oguchi, Sotaro Uemura, Juan G. Santiago, and Hirofumi Shintaku, "On-chip Electric Fractionation of Cellular Components for Sequencing at Subcellular Resolution," *2017 Microfluidics, Physics and Chemistry of GRC*, Barga, Italy, 4th – 9th June (2017).
  - 7- Hirofumi Shintaku, Mahmoud N. Abdelmoez, Kei Iida, Yusuke Oguchi, Sotaro Uemura, "Integrated nuclear and cytoplasmic RNA sequencing of single cells," *the AGBT 2017*, Orland, USA, 13th – 16th February (2017).
  - 8- Shota Hata, Mahmoud N. Abdelmoez, Ryuji Yokokawa, Hidetoshi Kotera, Hirofumi Shintaku, "Extraction efficiency of RNA at single cell level via microfluidic isotachopheresis," *the Mechanical Engineering Congress*, Kyushu, Fukuoka, Japan, 11th – 14th September (2016), J0540301.
  - 9- Hassan A. Ali, Waleed M. Salman, Mahmoud N. Abdelmoez, Mohamed E. Heragy, Mohamed S. Abdelsalam, Mohamed F. F. Eldosoky, and Mohammed Abdelgawad, "Effect of interfacial electrical shear stresses on hydrodynamic flows inside droplets actuated by electrowetting on dielectric," *the 10th International Meeting on Electrowetting*, Taipei, Taiwan, 19th – 22nd June (2016).
  - 10- Mahmoud N. Abdelmoez, Ahmed H. H. Ali, Ibrahim. M. Ismail, Ali K. Abdel-Rahman, Ahmed M. Reda and Peter Schwerdt. "Effect of hot and cold buffers on the performance of a residential scale solar driven adsorption cooling system." *the 7th Annual Conf. on Future of new and renewable energy in the Arab world*, Assiut, Egypt, 12th – 13th February (2013).
  - 11- Ahmed M. Reda, Ahmed H. H. Ali, Ibrahim S. Taha, Mahmoud N. Abdelmoez, Mahmoud G. Morsy and Peter Schwerdt. "Performance Assessment of a Solar Powered Residential Scale Adsorption Cooling System at Assiut, Egypt." *the 7th Annual Conf. on Future of new and renewable energy in the Arab world*, Assiut, Egypt, 12th – 13th February (2013).

## Work and research experience

### *Postdoc researcher*

*December 2019 – Present*

Microfluidics RIKEN Hakubi Research Team

- Development of microfluidics technology for spatial, temporal, and hierarchical analysis of biological samples at single-cell level.

### *Technical and Research Assistant*

*April 2019 – December 2019*

Microfluidics RIKEN Hakubi Research Team

- Development of microfluidics system for parallel analysis of multiple single cells by electrophoresis.

### *Student Trainee*

*April 2018 – April 2019*

Microfluidics RIKEN Hakubi Research Team

- Studying of RNA extraction dynamics under focused electric field.
- Development of microfluidic devices for subcellular components analysis.

### *PhD Candidate*

*April 2016 – September 2019*

Micro-Engineering department, Kyoto University

- Performing single-cell related research via microfluidics.
- Design microfluidic devices for handling and purification of nucleic acids.
- Analysis of subcellular components of macromolecules.

### *Research Student*

*September 2015-March 2016*

Micro-Engineering department, Kyoto University

- Understanding the fundamentals of microfluidics in single cell applications.
- Optimizing the design of a microfluidic structure to capture and lyse single cells using FEM.
- Studying, theoretically, the nucleic acid adsorption on the micro-channels surfaces.

### *Research Assistant*

*April 2015-September 2015*

Assiut Microfluidics Lab (AML)

- I was working with the microfluidic lab. Team in order to visualize fluid flow inside micro-liter droplets.
- Purchasing and testing new equipment related to the microfluidics applications.

### *Assistant Lecturer*

*January 2015-September 2015*

Mechanical Engineering Department, Faculty of Engineering, Assiut University

- Assisted in teaching some courses in the Mechanical Engineering Department (fluid mechanics, Thermodynamics, Energy systems, Air conditioning and refrigeration).
- Assisted teaching the performance evaluation of solar collectors (Flat Plate and Evacuated tube collectors).

### *Demonstrator*

*January 2009 – January 2015*

Mechanical Engineering Department, Faculty of Engineering, Assiut University

- Assist in teaching some courses in the Mechanical Engineering Department (fluid mechanics, Thermodynamics, Energy systems, Air conditioning and refrigeration, Renewable energy)
- Work with a team in design and operate a two axis solar tracking system.
- Work in a graduation project in design and manufacturing of a vertical axis wind turbine
- Participate in construction and installation work of a solar driven adsorption cooling system.
- Operate and test a solar adsorption cooling system.

## Technical skills

- Design of large-scale solar thermal system.
- Design and fabrication of microfluidic systems.
- Extraction, purification, and fractionation of nucleic acids from single cells via microfluidic electrophoresis.

## Languages

- Arabic: native language.
- English: TOEFL IBT, score: 70, December (2014).

## Projects

### *SINC-seq: Single Cell Integrated Nuclear and Cytoplasmic RNA sequencing.*

- In this project, we developed a microfluidic protocol for fractionation and sequencing of both nuclear and cytoplasmic RNA from the same single cell.

### *Solar-driven adsorption cooling system*

- During this project, I was responsible for operation and analyzing the data for a residential scale solar-driven adsorption cooling system during the period from June 2012 to June 2014. The project was performed in the Faculty of engineering of Assiut University.

### *Hydraulic Circuit of a Stacker machine*

- **Case study “Redesign of Hydraulic system of stacker machine in Assiut Cement Factory”:**  
*Mech. Eng. Dep. Power sec. Assiut University-2007.*
- As undergraduate students, we analyzed the hydraulic circuit of a stacker machine.
- Redesign the different components of the circuit.

## Internships

### *Microfluidics RIKEN Hakubi Research team*

*April 2018 – Present*

- During this period, I got a chance to continue my Ph.D. projects at the RIKEN institute of physical and chemical research. Our work is focusing on single cell assays using micro-electrokinetics techniques.

### *Cemex Co., Egypt*

*July 2006 and 2008*

- Observed the whole cement production process in the maintenance department
- Recognized functions and working principles of different production machines over the production line.

### *Assiut Oil refining Co. (ASORC)*

*July 2005*

- During this training, we were allowed to observe the operation and sequence of the oils separation mechanisms.
- Attended the maintenance of some mechanical components.

## Attended courses and diplomas

### *Pathways to higher education*

*June 2007*

- Development of thinking and managerial skills.
- I attended the behavioral approach section.
- The project was funded by Ford foundation
- I got an overall GPA of 4.37 (total grade of 5.0)

### *Productivity and total quality management*

*October 2007*

- This course was a grant to the top five students that passed the course of “Pathways to higher education”.

### *POLYSUN Software*

*June 2013*

- One-day-training on the POLYSUN software for the design and optimization of solar systems by VELASOLARIES Co.

### *Training of the trainers (ToT)*

*April and June 2014*

- The training produced trainers in the design of large-scale solar thermal systems.
- It was conducted by the RENAC academy, Germany.

- I conducted four sequential training in the same topic during 2015.

## Scholarships and research awards

- MEXT scholarship, I got the Japanese government scholarship for foreign students to cover my Ph.D. studies at Kyoto University, Japan. (October 2015 – March 2019)
- ImPACT Serendipiter Award, 内閣府革新的研究開発推進プログラム「セレンディピティの計画的創出による新価値創造」 (代表：合田圭介) (2017年3月4日)
- Marubun Research Promotion Foundation, the 22nd financial assistance for young researchers. (April 2019 – March 2020).
- RIKEN Research Incentive Award, this award is given to young researchers for their research activities during the previous year. (March 2019)

## Travel grants

- The travel grant award of Yoshida Foundation for Science and Technology (1,300\$). 2018

## Interests

- Microfluidics.
- Single-cell studies.
- Fluid Mechanics and Heat transfer.
- Solar cooling/heating systems.