

Mohamed Omar Ahmad Abdelgawad, Ph.D.

Mechanical Engineering Department
American University of Sharjah, Sharjah, UAE
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Education

- PhD in Mechanical Engineering* December, 2008
University of Toronto, Canada.
Supervisor: Prof. Aaron Wheeler, Department of Chemistry
Thesis title: Digital Microfluidics for Integration of Lab-on-a-Chip Devices.
- MASc in Mechanical Engineering* August, 2003
Concordia University, Montreal, Canada
Supervisor: Prof. Ibrahim Hassan
Thesis title: Numerical Simulation of Transient Performance of Viscous Micropumps.
- Bachelor of Engineering* August, 1998
Department of Mechanical Engineering, Assiut University, Egypt
Thesis title: Design and Manufacturing of an Evaporative Air Cooler

Employment

- Associate Professor* August, 2018 - Present
Mechanical Engineering Department, American University of Sharjah, UAE
- Associate Professor* March 2016 – August, 2018
Mechanical Engineering Department, Assiut University, Egypt
- Adjunct Assistant/Associate Professor* January, 2015 – June, 2017
Center of Nanotechnology
Zewail City of Science and Technology, Egypt
- Director* November, 2011 – March 2013
Knowledge Transfer office (KTO), Assiut University, Egypt
The KTO is responsible for promoting and carrying out technology transfer activities (IP protection and commercialization) at Assiut University.
- Assistant Professor* September, 2010 – March 2016
Mechanical Engineering Department, Assiut University, Egypt
- Post Doctoral Fellow* January, 2009 – August, 2010
Department of Surgical Oncology, University of Toronto
Project title: High-Speed Electromechanical Characterization of Biological Cells for Bladder Cancer Diagnosis.
- Research Assistant* September, 2004 – December, 2008
Wheeler Microfluidics Laboratory, Department of Chemistry, University of Toronto.
- Assistant lecturer* September, 2003 – August, 2004
Mechanical Engineering Department, Assiut University, Egypt
- R&D Engineer (part time)* April, 2003 – August, 2003
Hardt Equipment Manufacturing Inc., Montreal, Canada.

Research Assistant
Concordia University, Montreal, Canada

May, 2001 – September, 2003

Teaching Assistant
Mechanical Engineering Department, Assiut University, Egypt

October, 1998 – April, 2001

Publications

Author statistics from Scopus (Author ID: 6508318697)

Total number of citations	1056
<i>h</i> – index	16

Patents

1. A. R. Wheeler, I. Barbulovic-Nad, H. Yang, and M. Abdelgawad, Exchangeable Sheets Pre-Loaded with Reagent Depots for Digital Microfluidics, United States patent # US8,187,864B2.
2. N. Mousa, M. J. Jebrail, M. Abdelgawad, R. F. Casper, and A. R. Wheeler, Method of Hormone Extraction Using Digital Microfluidics, United States patent # US 8,202,736 B2.
3. M. W. L. Watson, M. Abdelgawad, Mais Jebrail, Hao Yang, and A. R. Wheeler, Hybrid Digital and Channel Microfluidic Devices and Methods of Use Thereof, United States Patent # US9,039,973B2.

Book Chapters

1. Liu, J., D.G. Pyne, M. Abdelgawad, and Y. Sun, Appendix C: Automated Vitrification of Mammalian Embryos on a Digital Microfluidic Device, in Cryopreservation of Mammalian Gametes and Embryos, Methods in Molecular Biology, Z.P. Nagy, A.C. Varghese, and A. Agarwal, Editors. 2017, Humana press (By Springer): New York, NY, USA. p. 309-316.

Journal Papers

1. T. M. Elsherry, M. A. Abdel-Ghani, N. S. Abou-Khalil, M. Elsayed, and M. Abdelgawad, Effect of pH on Rheotaxis of Bull Sperm Using Microfluidics, *Reproduction in Domestic Animals*, vol. 52, n. 5, pp. 781-790, 2017.
2. M. Elsayed, T. M. Elsherry, and M. Abdelgawad, Development of Computer Assisted Sperm Analysis (CASA) Plugin for analyzing sperm motion in microfluidic environments using Image-J, *Theriogenology*, vol. 84, n. 8, pp. 1367-1377, 2015.
3. Hassan A, Ali, Hany A. Mohamed, and M. Abdelgawad, Repulsion-Based Model for Contact Angle Saturation in Electrowetting, *Biomicrofluidics*, vol. 9, pp. 014115, 2015.
4. T. M. Elsherry, M. Elsayed, H.K. Abdelhafez, and M. Abdelgawad, Characterization of Rheotaxis of Bull Sperm Using Microfluidics, *Integrative Biology*, vol. 6, n. 12, pp. 1111-1121, 2014.
 - This paper was featured on the outside front cover of the 12th issue of Integrative Biology (Dec. 2014).
5. D.G. Pyne, J. Liu, M. Abdelgawad, and Y. Sun, Digital microfluidic processing of mammalian embryos for vitrification, *PLoS ONE*, vol. 9, n. 9, pp. e108128, 2014.
6. D. G. Pyne, W. M. Salman, M. Abdelgawad, and Y. Sun, Partially filled electrodes for digital microfluidic devices, *Applied Physics Letters*, vol. 103, n. 2, pp. 024103, 2013.
7. Bassam Alfeeli, Ma'moun Al-Rawashdeh, Ali Bumajdad, Haider Al Lawati, M. Abdelgawad, Zouhair M. Baccar, Issam Ben Salem, and Faysal Benaskar, A review of nanotechnology development in the Arab World, *Nanotechnology Reviews*, vol. 2, n. 3, pp. 359–377, 2013.

8. J. Chen, M. Abdelgawad, L. Yu, N. Shakiba, W.Y. Chien, Z. Lu, W. B. Geddie, M. A.S. Jewett, and Y. Sun, Electrodeformation for Single Cell Mechanical Characterization, *Journal of Micromechanics and Microengineering* vol. 21, pp. 054012, 2011.
9. M. Abdelgawad, C. Wu, W. Chien, M. A.S. Jewett, and Y. Sun, A Fast and Simple Method to Fabricate Circular Microchannels in Polydimethylsiloxane (PDMS), *Lab on a Chip*, vol. 11, pp. 545-551, 2011.
10. M. Moscovici, W. Chien, M. Abdelgawad, and Y. Sun, Electrical power free, low dead volume, pressure-driven pumping for microfluidic applications, *Biomechanics*, vol. 4, pp. 046501, 2010.
11. N. A. Mousa, M. J. Jebrail, H. Yang, M. Abdelgawad, P. Metalnikov, J. Chen, A. R. Wheeler, and R. F. Casper, Droplet-Scale Estrogen Assays in Breast Tissue, Blood, and Serum, *Science Translational Medicine*, vol. 1, n. 1, pp. 1ra2, 2009.
 - Featured on the front cover of the first issue of Science Translational Medicine (Oct. 7th, 2009).
 - Featured in news story by GlobalTV (nationwide TV channel in Canada) on Oct. 7th, 2009.
12. M. Abdelgawad, P. Park, and A. R. Wheeler, Optimization of Device Geometry in Single-Plate Digital Microfluidics, *Journal of Applied Physics*, vol. 105, n. 9, pp. 094506, 2009.
13. M. Abdelgawad, M. W. L. Watson, and A. R. Wheeler, Hybrid Microfluidics: A Digital-to-Channel Interface for In-Line Sample Processing and Chemical Separations, *Lab on a Chip*, vol. 9, n. 8, pp. 1046-1051, 2009.
 - Featured on the front cover of the April, 2009 issue (vol. 9, n.8) of *Lab on a Chip*.
14. H. Yang, V. N. Luk, M. Abdelgawad, I. Barbulovic-Nad, A. R. Wheeler, A World-to-Chip Interface for Digital Microfluidics, *Analytical Chemistry*, vol. 81, n. 3, pp. 1061-1067, 2009.
15. M. Abdelgawad and A. R. Wheeler, The Digital Revolution: A New Paradigm of Microfluidics, *Advanced Material*, vol. 21, pp. 920-925, 2009.
16. M. Abdelgawad, M.W.L. Watson, E.K.W. Young, J. Mudrik, M.D. Ungrin, and A. R. Wheeler, Soft-lithography: Masters on Demand, *Lab on Chip*, vol. 8, pp. 1379 – 1385, 2008.
17. M. Abdelgawad, S. Freire, H. Yang, and A. R. Wheeler, All-Terrain Droplet Actuation, *Lab on Chip*, vol. 8, pp. 672-677, 2008.
 - Highlighted in Nature vol. 452, pp.668-669, 2008.
18. M. Abdelgawad and A. R. Wheeler, Low-Cost, Rapid-Prototyping of Digital Microfluidics Devices, *Microfluidics and Nanofluidics*, vol. 4, n. 4, pp. 349-355, 2008.
19. M. Abdelgawad and A. R. Wheeler, Rapid Prototyping in Copper Substrates for Digital Microfluidics, *Advanced Materials*, vol. 19, 133-137, 2007.
20. M.W.L. Watson, M. Abdelgawad, G. Ye, N. Yonson, J. Trottier, and A. R. Wheeler, Micro-Contact Printing-Based Fabrication of Digital Microfluidic Devices, *Analytical Chemistry*, vol. 78, n. 22, pp. 7877-7885, 2006.
21. M. Abdelgawad, I. Hassan, N. Esmail, and P. Phutthavong, Numerical Investigation of Multistage Viscous Micropump Configurations, *Journal of Fluids Engineering*, vol. 127, n. 4, pp. 734-742, 2005.
22. M. Abdelgawad, I. Hassan, and N. Esmail, Transient Behavior of the Viscous Micropump, *Microscale Thermophysical Engineering*, vol. 8, n. 4, pp. 361-381, 2004.
23. I. Hassan, P. Phutthavong, and M. Abdelgawad, Microchannel Heat Sinks: An Overview of The State-of-The-Art, *Microscale Thermophysical Engineering*, vol. 8, n.3, pp. 183 – 205, 2004.

Conference Papers

1. T.M. EL-sherry, M.A. Abdel-Ghani, H.K. Abdel Hafez, and M. Abdelgawad, Sperm Rheotaxis in Fertile and Infertile Men, accepted in The 9th Cairo International Biomedical Engineering Conference (CIBEC 2018), Cairo, to be held on 20-22 December, 2018.
2. Mahmoud Abdelkarim, Noura H. Abd Ellah, Mahmoud Elsabahy, Sara A. Abouelmagd, and Mohamed Abdelgawad, Optimization of Preparation of Polymeric Nanoparticles using Microfluidics, accepted for publication in The 22nd International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS 2018), Kaohsiung, Taiwan 11-15 November, 2018.
3. Ahmad Altayyeb, Maha Khashbah, Abdelhady Esmael, Mohamed El-Mokhtar, Abdelbadei Sharkawy, Mohamed Abdelgawad, and Essam Othman, Mechanical Characterization Of Endometrial Cells as a Non-Surgical Diagnostic Test For Endometriosis, The 21st International Conference on Miniaturized Systems for Chemistry and Life Sciences (microTAS 2017), Savannah, Georgia, USA, 22-26 October, 2017.
4. A.M. Esmael, A.B. Sharkawy, T. ElMelegy and M. Abdelgawad, Real-time open source machine vision software for closed loop control of flow in microfluidics devices, The 20th International Conference on Miniaturized Systems for Chemistry and Life Sciences (microTAS 2016), Dublin, Ireland , 9-13 October, 2016.
5. Saif Al-Mofty, Nagwa El-Badri, Ahmad Altayyeb, Omnia Omar, Mohamed Elsayed, Ahmed Wahbi, Hassan Ali, Mohamed Abdelgawad, and Noha Mousa, One stop lab on chip platform for tissue processing and cell sample preparation, the 20th International Conference on Miniaturized Systems for Chemistry and Life Sciences (microTAS 2016), Dublin, Ireland , 9-13 October, 2016.
6. Alsaeed Abualsayed, Khaled Shabaan, Ali AboEl-Lail, and Mohamed Abdelgawad, A 50\$ complete digital microfluidics device and actuation setup, the 20th International Conference on Miniaturized Systems for Chemistry and Life Sciences (microTAS 2016), Dublin, Ireland , 9-13 October, 2016.
7. W. M. Salman, H. A. Ali, M. S. Abdelsalam, M. F. F. Eldosoky, and M. Abdelgawad, Interfacial electrical shear stresses induce electrohydrodynamic flows inside droplets actuated by electrowetting, ASME International Mechanical Engineering Conference and Exposition, Houston Texas, 13-19 Nov. 2015.
8. M. B. Effat, M. S. Abdelkareem, O. Hassan, and M. Abdelgawad, Numerical investigations of the effect of flow arrangement and number of layers on the performance of multi-layer microchannel heat sinks, ASME International Mechanical Engineering Conference and Exposition, Houston Texas, 13-19 Nov. 2015.
9. M. Elsayed, T. M. Elsherry, and M. Abdelgawad, Development of Computer Assisted Sperm Analysis (CASA) Plugin for analyzing sperm in microfluidic environments using Image, The 7th Cairo International Biomedical Engineering Conference (CIBEC 2014), Cairo, Egypt, 11-13 December, 2014.
10. T. M. Elsherry, M. Elsayed, H.K. Abdelhafez, and M. Abdelgawad, Characterization of Rheotaxis of Bull Sperm Using Microfluidics, The 7th Cairo International Biomedical Engineering Conference (CIBEC 2014), Cairo, Egypt, 11-13 December, 2014.
11. Omnia Ahmed, Hassan Abdellah, Noha Mousa, Mohamed El-Sayed, Mohamed Abdelgawad, and Nagwa El-Badri, Tissue Dissociation Miniaturized Platform for Uterine Stem Cell Isolation and Culture, The 7th Cairo International Biomedical Engineering Conference (CIBEC 2014), Cairo, Egypt, 11-13 December, 2014.
12. W. M. Salman, M.S. Abdelsalam, M.F. F. El-Dosoky, and M. Abdelgawad, Effect of Electrical Conductivity and Permittivity of Liquids and Frequency of The Applied Voltage On Droplets Actuation On Digital Microfluidic Devices, The 18th International Conference on Miniaturized

- Systems for Chemistry and Life Sciences (microTAS 2014), San Antonio, USA, 26-31 October, 2014.
13. A.M. Esmaeel, A.B. Sharkawy, T. Elmelegy and M. Abdelgawad, Development of a Simple, Robust and Real-Time Image Processing Algorithm For Tracking and Analyzing Cells and Droplets Inside Microchannels, The 18th International Conference on Miniaturized Systems for Chemistry and Life Sciences (microTAS 2014), San Antonio, USA, 26-31 October, 2014.
 14. D. G. Pyne, J. Liu, M. Abdelgawad, and Y. Sun, Automated vitrification of mammalian embryos on a Digital microfluidic device, MEMS 2014, San Fransisco, USA, 25-30 January 2014.
 15. D. G. Pyne, W. M. Salman, M. Abdelgawad, and Y. Sun, Partially filled electrodes for digital microfluidic devices, The 17th International Conference on Miniaturized Systems for Chemistry and Life Sciences (microTAS 2013), Freiburg, Germany, 27-31 October, 2013.
 16. J. Chen, M. Abdelgawad, L. Yu, N. Shakiba, W. Y. Chien, Z. Lu, and Y. Sun, Electrodeformation For Single Cell Mechanical Characterization, MEMS 2011, Cancun, 23-27 January, 2011.
 17. M. Abdelgawad, W. Chien, T. Liang, and Y. Sun, Microfluidic platform with circular microchannels for facile cell trapping and single cell analysis, microTAS 2010, Groningen, Netherland, 3-7 October, 2010.
 18. M. Abdelgawad, C. Wu, W.Y. Chien, and Y. Sun, A Fast And Simple Method To Fabricate Circular Microchannels In Polydimethylsiloxane (PDMS), MEMS 2010, Hong Kong, 24-28 January, 2010.
 19. M. J. Jebrail, N. A. Mousa, H. Yang, M. Abdelgawad, R. F. Casper, and A. R. Wheeler, Droplet-Scale Estrogen Assays in Breast Tissue, Blood, and Serum, microTAS 2009, Jeju, Korea, 1-5 November, 2009.
 20. H. Yang, V. Luk, M. Abdelgawad, I. Barbulovic-Nad, and A. R. Wheeler, Exchangable Pre-Loaded "Skin Depot" for Digital Microfluidics, microTAS 2008, San Diego, California, 12-16 October, 2008.
 21. A.R. Wheeler, M. Abdelgawad, M.W. Watson, Hybrid-Digital-Channel Microfluidics for Pre-processing and Separations, microTAS 2008, San Diego, California, 12-16 October, 2008.
 22. Sergio L.S. Freire, M. Abdelgawad, Hao Yang and Aaron Wheeler, 3D Droplet Actuation in Digital Microfluidics Devices: Towards Integration with Mass Spectrometry, microTAS 2007, Paris, France, 7-11 October 2007.
 23. M. Abdelgawad and A. R. Wheeler, 3D Droplet Actuation in Digital Microfluidics Devices, Transducers'07, Lyon, France, 10-14 June, 2007.
 24. M. Abdelgawad, I. Hassan, N. Esmail, and P. Phutthavong, Multistage Viscous Micropumps, ASME 2nd International Conference on Microchannels and Minichannels, Rochester, NY, USA, June 2004.
 25. M. Abdelgawad, I. Hassan, P. Phutthavong, and N. Esmail, Towards a Better Understanding of Viscous Micropumps: Transient Performance, Eurotherm Seminar No.75-Microscale Heat Transfer2, University of Reims, France, July 2003.
 26. P. Phutthavong, M. Abdelgawad, and I. Hassan, Heat Transfer and Fluid Flow in Microchannel Heat Sinks: An Overview of the Current State-of-The-Art, 3rd International Conference on Heat and Mass Transfer, Banff, Canada, May 2003.

Conference Abstracts (name of presenter in italic)

1. *Essam R. Othman*, Mohamed Abdelgawad, Maha Y. Khashbah, and Ahmed Altayeb, Mechanical stiffness of eutopic endometrial stromal cells is a potential biomarker for endometriosis, 3rd Upper Egypt Assisted Reproduction Conference, 21-23 Feb., 2018, Cairo, Egypt.

2. *Hatem K. Abdelhafez*, Taymour M. Elsherry, Mohamed M. Abdelghany, and Mohamed Abdelgawad, Sperm Rheotaxis: Evaluation and Application, 3rd Upper Egypt Assisted Reproduction Conference, 21-23 Feb., 2018, Cairo, Egypt.
3. *A. Altayeb*, S. El-Mofty, M. Abdelgawad, Cellular Mechanical Characterization Through Elastic Deformation of Micro Posts, EMBL Microfluidics 2016, Heidelberg, Germany, 24-26 July 2016.
4. *N. A. Mousa*, M. J. Jebrail, H. Yang, M. Abdelgawad, P. Metalnikov, R.F. Casper, and A.R. Wheeler, Estrogen Extraction From Microdrop Clinical Samples by Digital Microfluidics, The 5th International Conference on Microtechnologies in Medicine and Biology (MMB 2009), Quebec City, Canada. 1-3 April, 2009.
5. *M. W. L. Watson*, M. Abdelgawad, and A. R. Wheeler, Hybrid Microfluidics for Pre-Processing and Separations, 23rd International Symposium on Microscale Bioseparations (MSB 2009), Boston, MA USA. 1-5 February, 2009.

Conference Presentations

1. The 20th International Conference on Miniaturized Systems for Chemistry and Life Sciences (microTAS 2016, Dublin, Ireland , 9-13 October, 2016. Poster title: "One stop lab on chip platform for tissue processing and cell sample preparation".
2. The 20th International Conference on Miniaturized Systems for Chemistry and Life Sciences (microTAS 2016, Dublin, Ireland , 9-13 October, 2016. Poster title: "A 50\$ complete digital microfluidics device and actuation setup".
3. 10th International Meeting on Electrowetting, Taipei, Taiwan, 19-22 June, 2016. Talk title: "Contact angle saturation in light of repulsion between charges trapped on droplet surface".
4. 10th International Meeting on Electrowetting, Taipei, Taiwan, 19-22 June, 2016. Poster title: "Interfacial electrical shear stresses induce electrohydrodynamic flows inside droplets actuated by electrowetting".
5. ASME International Mechanical Engineering Conference and Exposition, Houston Texas, 13-19 Nov. 2015. Talk title: "Interfacial electrical shear stresses induce electrohydrodynamic flows inside droplets actuated by electrowetting".
6. ASME International Mechanical Engineering Conference and Exposition, Houston Texas, 13-19 Nov. 2015. Talk title: "Numerical investigations of the effect of flow arrangement and number of layers on the performance of multi-layer microchannel heat sinks".
7. The 7th Cairo International Biomedical Engineering Conference (CIBEC 2014), Cairo, Egypt, 11-13 December, 2014. Talk title: "Characterization of Rheotaxis of Bull Sperm Using Microfluidics".
8. The 18th International Conference on Miniaturized Systems for Chemistry and Life Sciences (microTAS 2014), San Antonio, USA, 26-31 October, 2014. Poster title: "Effect of Electrical Conductivity and Permittivity of Liquids and Frequency of The Applied Voltage On Droplets Actuation On Digital Microfluidic Devices"
9. The 18th International Conference on Miniaturized Systems for Chemistry and Life Sciences (microTAS 2014), San Antonio, USA, 26-31 October, 2014. Poster title:" Development of a Simple, Robust and Real-Time Image Processing Algorithm For Tracking and Analyzing Cells and Droplets Inside Microchannels"
10. Advances in Microfluidics and Nanofluidics, South Bend, Indiana, USA, 23-26 May, 2013. Poster title: "Repulsion-based model for explanation of contact angle saturation".
11. Micro Flow Chemistry And Biology Workshop (MIFCAB), 7th-8th November, 2012, Dead Sea Jordan. Presentation title: "Digital microfluidics: a new tool in the microfluidics tool box".
12. The First International Biotechnology Innovation Conference (IBIC), Cairo, Egypt, 21-23 November, 2010. Presentation title: "Microfluidic platform for facile cell trapping and single cell analysis".

13. The 14th International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS 2010), Groningen, Netherland, 3-7 October 2010. Poster title: "Microfluidic platform with circular microchannels for facile cell trapping and single cell analysis".
14. The 23rd IEEE International conference on Micro Electro Mechanical Systems (MEMS 2010), Hong Kong, 24th-28th January, 2010. Poster title: "Fast, Simple Fabrication of Circular Microchannels in Polydimethylsiloxane (PDMS)".
15. 6th International Meeting on Electrowetting, Los Angeles, California, 20th – 22nd August, 2008. Poster title: "Optimization of Device Geometry in Single-Plate Digital Microfluidics Devices". Received Best Poster award (offered to best three posters in the meeting).
16. Microfluidics and Nanofluidics 2008, Cancun, Mexico, 21st-24th Feb., 2008. Presentation title: "Master-Printing: An Ultra-Rapid Prototyping Technique for Fabricating Microfluidic Devices".
17. Transducers'07, Lyon, France, 10-14 June, 2007. Poster title: "3D Droplet Actuation in Digital Microfluidics Devices".
18. The 56th Canadian Chemical Engineering Conference, Sherbrooke, Quebec, 15-18 October, 2006. Presentation title: "Rapid Prototyping in Copper Substrates for Digital Microfluidics".
19. The 3rd International Conference on Heat and Mass Transfer, Banff, Alberta, May 2003. Presentation title: "Heat Transfer and Fluid Flow in Microchannel Heat Sinks: An Overview of the Current State-of-The-Art".

Invited Talks

1. "Mechanical properties of Endometrial cells as a biomarker for endometriosis", International Conference on Material Science and Engineering-2018, Egypt-Japan University of Science and Technology, Alexandria, Egypt, 11-13 March, 2018.
2. "Microfluidic techniques for assisted reproduction", The 1st New York University in Abu Dhabi Biomedical and Biosystems Conference, Abu-Dhabi, UAE, 9-11 April 2017.
3. "Microfluidic techniques for assisted reproduction", Kyoto University, Japan, 12th July, 2016.
4. "Contact angle saturation in light of repulsion between charges trapped on droplet surface", 10th International Meeting on Electrowetting, Taipei, Taiwan, 19-22 June, 2016.
5. "Biological applications of microfluidics", Zewail City of Science and Technology, 7th May, 2014.
6. "Digital microfluidics: a new tool in the microfluidics tool box", Micro Flow Chemistry And Biology Workshop (MIFCAB), 7th-8th November, 2012, Dead Sea Jordan.
7. "Microfluidics: The Power of Small", Egypt-Japan University for Science and Technology E-JUST, 17th October, 2012.
8. "Microfluidics: The Power of Small", The American University in Cairo, Yousef Jameel Science and Technology Research Center, June 2011.
9. "How to be a Good Graduate Student? An Academic Survival Kit", University of Toronto, Civil Engineering Department, Transportation Engineering and Planning group seminar, November 2009.

Funding obtained

Grants obtained as a PI or Co-PI

Grants topics listed below the table.

No.	Funding Agency	Grant type	Funding amount	Year	Role	Funding Duration
1	Science and Technology	Research Support Grant ID # 25700	L.E. 89,850 (US\$ 5,130)	2017	Co-PI	1 year

	Development Fund					
2	Science and Technology Development Fund	Research Support Grant ID # 6905	L.E. 99,600 (US\$ 13,000)	2014	Co-PI	1 year
3	Science and Technology Development Fund	Research Support Grant (ID#6906)	L.E. 72,000 (US\$ 9,500)	2014	Co-PI	1 year
4	Science and Technology Development Fund	Basic and Applied Research (ID#5525)	L.E. 1,000,000 (US\$ 131,000)	2014	Co-PI	2 years
5	Science and Technology Development Fund	Capacity Building grant (ID#4918)	L.E. 4,741,000 (US\$ 750,000)	2012	PI	1 year
6	Science and Technology Development Fund	Research Support and Technology Development grant (ID#4850)	L.E. 100,000 (US\$ 16,000)	2012	Co-PI	1 year
7	Science and Technology Development Fund	Reintegration grant (ID#4081)	L.E. 1,498,000 (US\$ 230,000)	2011	PI	3 years

Grants obtained as a collaborator

Grants topics listed below the table.

No.	Funding Agency	Grant type	Funding amount	Year	Duration
8	Grand Challenges Canada	Stars in Global Health Grant# R-ST-POC-1807-11791	CAD\$ 100,000	2018	1 year
9	Grand Challenges Canada	Stars in Global Health (No. 0207-01)	CAD\$ 100,000	2013	1 year

Project title for each grant in the table is outlined below:

1. Cellular mechanical characterization through elastic deformation of microchannel walls (Declined due to delay in awarding the funds).
2. Computer vision for the automation of microfluidic platforms used for mechanical characterization of biological cells.
3. Design, Fabrication and Testing of a Micro-Channel Heat Sink for Cooling of Electronic Devices.
4. Non-surgical diagnosis of endometriosis: Incorporating clinical, hormonal and biomechanical factors into an integrated model.
5. Establishing the Microfluidics Application Research Unit (MARU) at Assiut University.
6. Microfluidic platform for complete sperm analysis. PI is Dr. Taymour Elsherry from faculty of Veterinary Medicine, Assiut University.

7. Modeling Droplet Actuation in Digital Microfluidics to Enhance its Performance in Biomedical Applications.
8. To Enable Proper Dosing for Effective Treatment of Hemolytic Disease of the Fetus and Newborn (HDFN) in Africa. PI is Prof. Y. Sun from mechanical engineering department, University of Toronto. Fund allocated to Assiut University is CAD\$5,000.
9. Development of low-cost equipment for blood tests in under-resourced countries. PI is Prof. Y. Sun from mechanical engineering department, University of Toronto. Fund allocated to Assiut University is CAD\$7,500.

Peer review

Reviewer for the following journals

	Journal	Publisher	Impact factor
1	Lab on Chip	Royal Society of Chemistry	6.05
2	Scientific Reports	Nature Publishing Group	5.2
3	Langmuir	American Chemical Society	3.99
4	Soft Matter	Royal Society of Chemistry	3.79
5	Journal of Colloid and Interface Science	Elsevier	3.78
6	Applied Physics letters	American Institute of Physics	3.41
7	Microfluidics and Nanofluidics	Springer	2.53
8	IEEE Sensors	IEEE	2.51
9	Journal of MicroElectroMechanical Systems	IEEE	1.93
10	Journal of Electrostatics	Elsevier	1.39

Awards and Scholarships

Research

Fulbright visiting Scholar grant (~\$30,000) - (declined)	May, 2018
cState Award for Early Career Researchers (50,000 EGP)	May, 2017
Second place for Best Paper award at The 7th Cairo International Biomedical Engineering Conference (CIBEC 2014)	December, 2014
Misr Elkheir Publication award	December, 2012
NSERC post doctoral fellowship (\$40,000/year for two years)	Winter, 2009
Best Poster award, 6th International Meeting on Electrowetting	Summer, 2008
Ontario Graduate Scholarship (\$15,000)	Summer, 2007
Ontario Graduate Scholarship, as an international student (\$15,000)	Summer, 2006
Lachlan Gilchrist Fellowship (\$6,000)	Fall, 2005

Academic

University of Toronto Fellowship (11,000/year for 4 years)	Fall, 2004
Power Corporation of Canada Graduate Fellowship (\$5,000)	Fall, 2002
Concordia University Partial Tuition Scholarship (\$700)	Fall, 2002

Concordia University Graduate Fellowship (\$9,000)	Fall, 2001
Concordia University International Fee Remission Award (~\$4,500)	Fall, 2001
First class honors from Syndicate of Egyptian Engineers	1998
Dr. Mahmoud Hassan Saadawi Award, Assiut University	1997
Dr. Ramadan Mohamed Sadek Award, Assiut University	1996
Dr. Aboelwafa Megahed Award, Assiut University	1994

Community service and leadership

Muslim Students' Association at UofT scholarship	Fall, 2007
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Supervisory Experience

Graduate Students

1. Mahmoud S. Abdelkareem (M.Sc Candidate, Mechanical Engineering): Nanoparticle synthesis using microfluidics. September 2015 – present.
2. Alsaeed Aboelsayed (M.Sc Candidate, Mechanical Engineering): A low cost digital microfluidic platform. September 2014 – present.
3. Ahmad Altayeb (M.Sc Candidate, Mechanical Engineering): A microfluidic device for characterization of linear elastic properties of biological cells. September 2013 – November 2017.
4. Abdelhady Mostafa Abdelhady (M.Sc Candidate, Mechanical Engineering): Implementation of image processing techniques in microfluidics applications. September 2012 – December 2016.
5. Waleed Salman (M.Sc Candidate, Mechanical Engineering): "Modeling droplet actuation in digital microfluidics". September 2012 – March 2016
6. Hassan Abdelmoumen (M.Sc Candidate, Mechanical Engineering): "Contact angle saturation in digital microfluidics". March 2012 – October 2015.
7. Derek Pyne (M.Sc. candidate, Mechanical and Industrial Engineering department, University of Toronto, Co-supervised with Prof. Y. Sun): "Digital microfluidics for automating embryos vitrification protocols". September 2011 – January 2014.

Undergraduate Students

1. Mohamed Zidan (BSc, Candidate, Nanotechnology Engineering): Mechanical Characterization of biological cells (summer research project 2016).
2. Di Xue (B.Sc candidate, Engineering Science): Mechanical Characterization of biological cells on a Lab-CD (summer research project 2010).
3. Chun Wu (B.Sc candidate, Engineering Science): Fabrication of circular PDMS microchannels for Lab on a Chip applications (summer research project 2008).
4. Philip S. Park (B.Sc candidate, Chemical Physics): Numerical simulation of droplet actuation in digital microfluidics devices using COMSOL multiphysics (summer research project, summer 2007). Research published in *Journal of Applied Physics*.
5. Jared Mudrik (B.Sc candidate, Chemistry): Rapid master fabrication from printed circuit boards for channel microfluidics. Research published in *Lab on a Chip*.
6. Aaron Ming (B.Sc candidate, Engineering Science): Automatic control of droplet actuation in digital microfluidic devices (4th year thesis, Fall 2007 and winter 2008)

7. Anthony Wong (B.Sc candidate, Microbiology): Automatic control of droplet actuation in digital microfluidic devices (summer research project, 2006).
8. George Ye (B.Sc. candidate, Engineering Science): Testing PDMS as a dielectric coating in digital microfluidic devices (summer research project, 2006).
9. Neal Yonson (B.Sc candidate, Chemistry) and Justin Trottier (B.Sc. candidate, Engineering Science): Microcontact printing-based fabrication of digital microfluidics devices (4th year thesis, Fall 2005 and winter 2006). Research published in *Analytical Chemistry*.
10. Patricia Phutthavong (B.Sc. candidate, Mechanical Engineering): Heat transfer and fluid flow in microdevices (undergraduate research project, winter and summer 2002). Research published in *Microscale Thermophysical Engineering*.

Training Experience

As the director of the Knowledge Transfer Office at Assiut University, I organized different training courses directed to faculty members and graduate students. Examples of these courses are listed below:

- Writing and publishing good journal papers (6 hours)
 - Why publishing?
 - Importance of starting with an outline.
 - Manuscript elements.
 - Choosing the right journal.
 - Writing the cover letter.
 - The peer review process.
 - Responding to journal rejections.
- How to be a good graduate student (4 hours)
 - Good research practices
 - Staying on top of literature
 - Assessing your research impact
 - Increasing your research visibility
- Protection of Intellectual property rights (3 hours)
 - Types of intellectual property rights (IPR).
 - More focus on patents
 - IPR exploitation (Licensing vs spin-offs)
- Writing grant proposals (3 hours)
 - Choosing your proposal topic
 - Overcoming the writer's block
 - Grant management
 - General advice
- How not to plagiarize (3 hours)
 - Definition of Plagiarism
 - Using external sources legitimately (paraphrasing, summarizing, Quoting)
 - Examples

Teaching Experience

Assiut University

Sept. 2010 - present

- Instructor for MP221 Engineering Analysis II (class size = 180 students)
<http://www.assiutmicrofluidics.com/courses/mp221-engineering-analysis-ii>
 - Created course website containing all assignments and midterms with their solutions.
 - Added a chapter in the course on using finite element package (COMSOL) as a tool for analyzing different physical phenomena.
 - Dedicated one lecture to introduce symbolic calculation software (Maple) to students.
- Instructor for MP334 Pumps, valves, and pipe networks (class size = 35 students)
<http://www.assiutmicrofluidics.com/courses/mp334-pumps-valves-and-pipe-networks>
 - Modified course contents and created course website to interact with students.
 - Coordinated with Assiut Oil Refinery to add practical part of the course including having one of their engineers giving some lectures in the course.
- Instructor for MP434 Gas Dynamics (class size = 5 students)
<http://www.assiutmicrofluidics.com/courses/gas-dynamics>
- Instructor for MP326 Measuring Instruments (Class size = 92 students)
<http://www.assiutmicrofluidics.com/courses/mp328-measuring-instruments>
- Instructor for M201 Hydraulics (class size = 140 students)
<http://www.assiutmicrofluidics.com/courses/m201-hydraulics>
- Instructor for EC303 Computer technology (Class size = 29 students)
<http://www.assiutmicrofluidics.com/courses/ec303-computer-technology>

Zewail City of Science and Technology

January, 2015 – June, 2017

- Instructor for NANENG 434 Microfluidics (class size 56 students)
<http://www.assiutmicrofluidics.com/courses/naneng-434-microfluidics>
 - Designed the course from scratch including its objectives, contents and assessment method.
 - Supervises 18 projects on different applications of microfluidics.
 - Created course website containing all assignments and midterms with their solutions and useful videos relevant to course material.
- Instructor for ENGR207 Fluid Mechanics (class size ranges from 40 - 120 students)
<http://www.assiutmicrofluidics.com/courses/engr207-fluid-mechanics>

University of Toronto

Sept. 2004 - 2010

- Coordinator for Prospective Professors in Training (PPIT) program, which aims at preparing senior graduate students for careers in academia.
 - Helped design program outline and decide which topics to be covered for each seminar.
 - Contacted and confirmed speakers for each seminar
 - Managed program website on Blackboard
- Tutor: MIE414 Applied Fluid Mechanics for 4th year Mech. Eng. students (Fall 2006, 2007, and 2008; class size: 30~60 students; course coordinator: Prof. Axel Guenther).
 - Solved examples on the board every tutorial and helped students with their assignments during office hours.
 - Helped design and run a microfluidic lab experiment for the first time.

- Lab instructor: MIE312 Fluid Mechanics for 3rd year Mech. Eng. Students (Fall 2005; class size: 125 students; course coordinator: Prof. Pierre Sullivan)
- Tutor and Marker: MIE100 Dynamics for 1st year Eng. Students (winter 2005, 2006, 2007, 2008 and summer 2005 and 2006; class size: 45 students courses coordinators: Prof. Leslie Sinclair and Prof. Pierre Sullivan)
 - Solved examples on the board every tutorial and helped students with their assignments during office hours.
 - Designed 2 quizzes per semester and marked biweekly quizzes.

Concordia University

May 2001 - August 2003

- Tutor: ENGR251 Thermodynamics-I for 2nd year Eng. Students (Fall 2001 and 2002; class size: ~40 students course coordinator: Prof. Ibrahim Hassan)
- Tutor and Marker: ENGR361 Fluid Mechanics-I for 3rd year Mech. Eng. students (summer 2001, 2002, 2003; class size: ~50 students; course coordinator: Prof. Ibrahim Hassan)
- Lab instructor: MECH352 Heat Transfer-1 for 3rd year Mech. Eng. students (winter 2002 and 2003; class size: 64 students; course coordinator Prof. Wahid Ghaly)
 - Ran 4 laboratory experiments to demonstrate steady state conduction, transient conduction, radiation, and fin performance.
 - Marked students lab reports.

Assiut University

October 1998 – April 2001

- Tutor and Marker for Fluid Mechanics, Thermodynamics, Mechanics of Machines I and II, and Mechanical Vibrations.
 - Class size ranged from 20 students to 90 students.
 - Tasks included solving examples during tutorials, helping students during office hours, and marking midterms.
 - Supervised many graduation projects for 4th year students.

Professional Development

- International Offices: 1-day workshop at DAAD Kairo Akademi, Cairo, June 2017.
- Team building for team leaders: 1-day workshop by DAAD Kairo AKademi, Assiut University, June 2015.
- Faculty Leadership and Development Center at Assiut University,: on several academic topics (Organizing conferences, Managing research teams, applying for grants, Strategic planning, University Administration, Assessment methods, E-learning) between 2014-2016.
- Patent information: 4-day workshop in the European Patent Office (EPO) in Vienna, Austria. This workshop introduces the patent system and the various granting procedures and patent information products. It includes an extensive hands-on training on using Espacenet (one of the largest patanet databases in the world) as a tool to find patent information.
- IP in Business Practice: 2-day workshop in the European Patent office (EPO) in Munich, Germany. This workshop covers available strategies for licensing IP in addition to IP enforcement.
- Building and Defending IP Value: 2-day workshop in the European Patent office (EPO) in Berlin, Germany. This workshop covers enforcing IP rights, licensing IP, valuing IP and open innovation.

- Patenting and Licensing: 2-day workshop in Politecnico di Torino, Torino, Italy. This workshop introduces researchers to best practices to protect intellectual property (IP), patent search databases, and IP management and exploitation.
- Business development: 3-day workshop in Politecnico di Torino, Torino, Italy. This workshop covers how to build a business plan, assess business opportunity, and do a market research.
- Idea to market: 2-day workshop at the American University in Cairo (AUC), Egypt. This workshop introduced business idea scouting, business planning, forming startups, and business incubation.
- Entrepreneurship 101: 26 hours non-credit course designed to introduce members of the research community to starting and growing a technology based business. Lectures covered a variety of related topics including protecting intellectual property, securing funding, defining markets, preparing a business plan, and hiring employees.
- Prospective Professors in Training (PPIT): one year program at University of Toronto preparing senior graduate students for Academic careers. Program includes a half credit course (MIE3002 Teaching Engineering in Higher Education) and biweekly seminars on how to apply for academic jobs, prepare for the job interview, negotiate your job offer, start a research program, and prepare for different academic challenges facing new professors.
- Teaching Assistants Training Program (TATP): a program offered at university of Toronto oriented toward new teaching assistants to prepare them for teaching duties. Program includes 5 seminars and in-class evaluation of teaching style.
- Graduate Teaching Assistants Professional Development: a 10 hours program offered at Concordia University for professional development of teaching assistants.
- Instructor preparation program: a 30 hours program offered at Assiut University to prepare new graduates for teaching duties.

Professional Membership

- Royal Society of Chemistry (RSC)