

Mahla Poudineh

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University of Waterloo
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EMPLOYMENT

Assistant Professor 01/2020 – present
University of Waterloo, Department of Electrical and Computer Engineering, Waterloo, ON

Visiting Professor 09/2023 – 02/2024
Massachusetts Institute of Technology, Koch Institute for Integrative Cancer Research (Host: Prof. Robert Langer), Boston, MA

Postdoctoral Fellow 04/2018 – 11/2019
Stanford University, School of Medicine, Stanford, CA
Project: Continuous Detection of Glucose and Insulin in Live Animals
Mentor: Prof. H. Tom Soh

Postdoctoral Fellow 02/2017 – 04/2018
University of Toronto, Leslie Dan Faculty of Pharmacy, Toronto, ON
Project: Efficient Neurogenesis of Mesenchymal Stem Cells via Mechanotransduction
Mentor: Prof. Shana Kelley

EDUCATION

Ph.D., Electrical Engineering 2012 – 2017
University of Toronto, Toronto, ON
Thesis: On-Chip Manipulation and Sorting of Cancer Cells for Next-Generation Diagnostic Technologies
Advisors: Prof. Edward Sargent and Prof. Shana Kelley

M.Sc., Electrical Engineering 2010 – 2012
University of Tehran, Tehran, Iran
Thesis: High Precision High Resolution Silicon Etching for Fabrication of Nano-Rod Arrays
Advisor: Prof. Shams Mohajerzadeh

B.Sc., Electrical Engineering, 2006 – 2010
University of Tehran, Tehran, Iran

AWARDS AND HONOURS

Johnson & Johnson WiSTEM²D Scholars Award in the Technology Category 2023
- An international award, only one award conferred per category annually

Engineering Research Excellence Award, Faculty of Engineering, University of Waterloo 2023

Research Excellence Award, ECE Department, University of Waterloo 2022

Waterloo Institute of Nanotechnology (WIN) Research Leader 2022

Emerging Investigator Award, *Nanoscale Journal* 2022
- [featured article](#): A platform for cervical cancer screening

Rising Star, *Advanced Healthcare Materials Journal* 2022
- [featured article](#): A platform for continuous glucose monitoring

UCLA CTSI Translational Science Award, Best Poster Winner for Translational Science 2019
University of California, Los Angeles

Rogers Scholarship 2013

Publication Award, Iran Nanotechnology Initiative Council 2014

Ranked 39th Among 400,000 Participants in National University Entrance Exam, Iran 2006

AWARDED RESEARCH FUNDING (total: ~\$3,143,500 USD since joining Waterloo in 2020)

Given the multidisciplinary nature of my research, I have established a strong network of collaborators spanning biology, chemistry, preclinical models and clinical expertise from McMaster University, University of Toronto, and Stanford. My lab has secured over \$3 million USD from competitive national and international agencies including NSERC (DG and 5 Alliance Grants), CIHR (the success was <16%, my application ranked in the top 97th percentile in the *Diabetes, Obesity, Lipid & Lipoprotein Disorders* panel), Mitacs, the Canadian Space Agency, and the Juvenile Diabetes Research Foundation.

Agency	Title	Role	Amount	Duration	Status
Johnson & Johnson	WiSTEM2D Award-Technology Category	PI	\$150,000 USD	01/2023 – 12/2025	Ongoing
Natural Sciences and Engineering Research Council (NSERC)-Alliance Grant (Mission); Industry Partner: Proflange	An Integrated Microfluidic, Metal Oxide Semiconductor Gas Sensor Combined with Machine Learning Optimization for Multiplexed Greenhouse Gas Detection	PI; Co-PI: Michael Pope	\$680,600 CAD	03/2023 – 03/2026	Ongoing
Graham Seed Funding	A New Transdermal Patch to Continuously and Without Pain Track and Treat Diabetes	PI	\$25,000 CAD	02/2023 – 02/2024	Ongoing
NSERC – Lab2Market	L2M NSERC - Integrated Microfluidic Electrochemical Assay for Cervical Cancer Detection at Point-of-Care Testing	PI	\$20,000 CAD	09/2022 – 12/2022	Completed
Deep Space Healthcare Challenge-Canadian Space Agency (First stage)	Heart-Tracker: A Wearable Platform for Real-Time Monitoring of Cardiac Markers in Interstitial Fluid	Co-PI; Co-PIs: Leyla Soleymain (McMaster), Yasaman Shayan (de Montrel)	\$30,000 CAD	05/2022 – 12/2022	Completed
Juvenile Diabetes Research Foundation (JDRF)	A pH Responsive Hydrogel Microneedle Patch for Continuous Measurement of Ketone Bodies and Glucose	PI; Co-Applicants: Peter Levine (Waterloo), Adria Giacca (Toronto)	\$875,000 USD	05/2022 – 04/2025	Ongoing
NSERC Alliance Grant; Industry Partner: AIH Tech. Inc.	An Integrated Microfluidic and Photonic Platform for Real-time Biomarker Quantification	Co-PI; PI: Dayan Ban (Waterloo)	\$462,000 CAD	05/2022 – 05/2025	Ongoing

Canadian Institutes of Health Research (CIHR)-Project Grant	Moving Beyond Blood Glucose with Continuous Multiplexed Hormone Measurement	PI; Co-PI: Jonathan Schertzer (McMaster)	\$956,250 CAD	10/2021 – 09/2026	Ongoing
NSERC Alliance Grant; Industry Partner: BlueLion Labs	A Microfluidic Assay for Rapid and Multiplexed Detection of Toxins in Water Samples	PI	\$30,000 CAD	07/2021 – 07/2022	Completed
Mitacs Accelerate; Industry Partner: Health Message Technology	Developing an Aptamer, Graphene Based Electrochemical Biosensor for Early Detection of Alzheimer	PI	\$60,000 CAD	05/2021 – 04/2023	Ongoing
Centre for Bioengineering & Biotechnology (CBB)-Seed Funding	A Wearable, Microneedle Aptamer-Based Biosensor for Continuous Tracking of Insulin and Glucose	PI; Co-Applicants: Juewen Liu (Waterloo), Peter Levine (Waterloo)	\$10,000 CAD	05/2021 – 04/2022	Completed
NSERC Alliance Grant; Industry Partner: Affinite Instruments	A Point-of-Care, Microfluidics-Based Approach for Multiplexed Detection of Biomarkers in Unprocessed Blood Using a Surface Plasmon Resonance Sensor	PI	\$80,769 CAD	01/2021 – 01/2023	Completed
NSERC Alliance Grant; Industry Partner: Mediphage	Purification of SARS-CoV-2 Virus-Like Particles (VLPs) Using a Microfluidic Technique for Downstream COVID-19 Vaccine Production	PI	\$50,000 CAD	06/2020 – 06/2021	Completed
NSERC Discovery Grant	Next-Generation Enabling Technologies Towards Precision and Personalized Medicine	PI	\$152,500 CAD	04/2020 – 04/2025	Ongoing
Canada Foundation for Innovation/ Ontario Research Fund (CFI/ORF)-JELF	Integrated Device-Driven Approaches for Automated, Real-Time Tracking	PI	\$320,000 CAD	04/2020 – 12/2022	Completed

PUBLICATIONS

Refereed Journal Articles

The trainees supervised by the applicant are in **bold font**; * refers to the authors who contribute equally; The corresponding author is underlined.

1. **F. Keyvani, H. Zheng, M. R. Kaysir, D. F. Mantaila**, F. A. Rahman, J. Quadrilatero, D. Ban, and M. Poudineh, “A Hydrogel Microneedle Assay Combined with Nucleic Acid Probes for On-site Detection of Small Molecules and Proteins,” *Angewandte Chemie International Edition*, 2023, 62, e202301624.
2. **Erfan Shirzadi*, Michelle Huynh*, Peyman GhavamiNejad*, Hanjia Zheng , Agosh Saini , Fatemeh Bakhshandeh , Fatemeh Keyvani , Dragos Mantaila**, Fasih A. Rahman, Joe Quadrilatero , Lyle Soleymani, Mahla Poudineh, “A PEDOT:PSS-Based Composite Hydrogel as a Versatile Electrode for Wearable Microneedle Sensing Platforms,” *Advanced Sensor Research*, accepted, 2023.
3. **Mahla Poudineh**, “Microneedle Assays for Continuous Health Monitoring: Challenges and Solutions,” *ACS Sensors*, Invited Perspective, *Submitted*.
4. **N. Debnath**, L. Live, and M. Poudineh, “A Microfluidic Plasma Separation Device Combined with Surface Plasmon Resonance for Biomarker Detection in Unprocessed Blood,” *Lab on a Chip*, 2023, 23, 572-579.
5. **H. Aghamohammadi**, K. Thomas, J. Deglint, A. Wong, and M. Poudineh, “A Competitive, Bead-Based Assay Combined with Microfluidics for Multiplexed Toxin Detection,” *Lab on a Chip*, 23, 3245-3257, 2023.
6. F. Al Fattah*, **H. Abouali***, **S. A. Hosseini**, J. Yin, A. Abdullah Khan, **H. Aghamohammadi**, M. Poudineh, and D. Ban, “Fluorescently Activated Protein Detection within a Miniaturized Optofluidic Platform for Point-of-Care (POC) Testing,” *Under Review*.
7. **P. Keshavarz Motamed, H. Abouali, M. Poudineh, and N. Maftoon**, “Experimental Measurement and Numerical Modelling of Deformation Behavior of Breast Cancer Cells Passing through Constricted Microfluidic Channels,” *Under Review*.
8. **P. GhavamiNejad***, A. GhavamiNejad*, **H. Zheng, K. Dhingra, M. Samarikhalaj, and M. Poudineh**, “A Conductive Hydrogel Microneedle-Based Assay for Real-time, Continuous, and Enzyme-less Glucose Measurement in Live Animals,” *Advanced Healthcare Materials*, 2022, p.e2202362-n/a. [Featured in Rising Star Series of Advanced Healthcare Materials](#).
9. **S. A. Odinotski, K. Dhingra, A. GhavamiNejad, H. Zheng, P. GhavamiNejad, and M. Poudineh**, “A Conductive Hydrogel-Based Microneedle Platform for Real-Time pH Measurement in Live Animals,” *Small*, 2022, 18, 45.
10. **H. Zheng***, A. GhavamiNejad*, **P. GhavamiNejad, M. Samarikhalaj, A. Giacca, and M. Poudineh**, “A Hydrogel Microneedle-Assisted Assay Integrating Aptamer Probes and Fluorescence Detection for Reagentless Biomarker Quantification,” *ACS Sensors*, 2022, 8, 2388-2399. [Featured as supplementary cover art](#).
11. **F. Keyvani***, **N. Debnath***, **M. Ayman Saleh**, and M. Poudineh, “An Integrated Microfluidic Electrochemical Assay for Cervical Cancer Detection at Point-of-Care,” *Nanoscale*, 2022, 14, 6761 - 6770. [Featured in Emerging Investigator Series in Nanoscale](#) & [Featured on front cover](#).
12. **H. Aghamohammadi, S. A. Hosseini, S. Srikant, A. Wong, and M. Poudineh**, “A Computational and Experimental Model to Study Immunobead-based Assays in Microfluidic Mixing Platforms,” *Analytical Chemistry*, 2022, 94, 4, 2087–2098.
13. **H. Abouali, S. A. Hosseini, E. Purcell, S. Nagrath, and M. Poudineh**, “Recent Advances in Device Engineering and Computational Analysis for Characterization of Cell-Released Cancer Biomarkers,” *Cancers*, 2022, 14, 288.

14. N. Moghimi, **S. A. Hosseini**, M. Poudineh, and M. Kohandel, "Recent Advances on Cancer-on-Chip Models: Development of 3D Tumors and Tumor Microenvironment," *Bioprinting*, 2022, 28, e00238.
15. S. A. Hosseini Farahabadi, M. Entezami, **H. Abouali**, H. Amarloo, M. Poudineh, and S. Safavi-Naeini, "Sub-Terahertz Silicon-Based On-Chip Absorption Spectroscopy Using Thin-Film Model for Biological Applications," *Scientific Reports*, 12, 17747, 2022.
16. M. Poudineh*, C. L. Maikawa*, E. Yue Ma, J. Pan, D. Mamerow, Y. Han, S. w Baker, A. Beirami, M. Eisenstein, S. Kim, J. Vuckovic, E.A. Appel, and H. T. Soh, "A Fluorescence Sandwich Immunoassay for the Real-Time Continuous Detection of Glucose and Insulin in Live Animals," *Nature Biomedical Engineering*, 2021, 5, 53–63.
17. B. L. K. Coles, M. Labib, M. Poudineh, B. T. Innes, J. Belair-Hickey, S. Gomis, Z. Wang, G. D. Bader, E. H. Sargent, S. O. Kelley, and D. Van der Kooy, "A Microfluidic Platform Enables Comprehensive Gene Expression Profiling of Mouse Retinal Stem Cells," *Lab on a chip*, 2021, 21, 4464-4476.
18. Z. Wang, L. Zhang, M. Labib, H. Chen, M. Wei, M. Poudineh, B.J. Green, B. Duong, J. Das, S. Ahmed, E. H. Sargent, and S.O. Kelley, "Peptide-Functionalized Nanostructured Microarchitectures Enable Rapid Mechanotransductive Differentiation," *ACS Applied Materials and Interfaces*, 2019, 11, 41030-41037.
19. M. Poudineh, E. H. Sargent, K. Pantel, and S. O. Kelley, "Profiling Circulating Tumour Cells and Other Biomarkers of Invasive Cancers," *Nature Biomedical Engineering*, Invited Review, 2018, 2.
20. M. Labib, R. M. Mohamadi, M. Poudineh, S. Ahmed, I. Ivanov, C. Huang, M. Moosavi, E. H. Sargent, and S. O. Kelley, "Single Cell mRNA Cytometry via Sequence-Specific Nanoparticle Clustering and Trapping," *Nature Chemistry*, 2018, 10, 489-495.
21. M. Poudineh, Z. Wang, M. Labib, M. Ahmadi, L. Zhang, J. Das, S. Ahmed, S. Angers, and S. O. Kelley, "Three-Dimensional Nanostructured Architectures Enable Efficient Neural Differentiation of Mesenchymal Stem Cells via Mechanotransduction," *Nano Letters*, 2018, 18, 7188-7193.
22. L. Kermanshah, M. Poudineh, S. Ahmed, L. N. Nguyen, S. Srikant, R. Makonnen, S. O. Kelley, "Dynamic CTC Phenotypes in Metastatic Prostate Cancer Models Visualized Using Magnetic Ranking Cytometry," *Lab on a Chip*, 2018, 18, 2055-2064.
23. G. Wang, J. Das, S. Ahmed, C. Nemr, L. Zhang, M. Poudineh, E. H. Sargent, and S. O. Kelley, "Curvature-Mediated Surface Accessibility Enables Ultrasensitive Electrochemical Human Methyltransferase Analysis," *ACS Sensors*, 2018, 3, 1765–1772.
24. M. Poudineh, P. M. Aldridge, S. Ahmed, B. J. Green, L. Kermanshah, V. Nguyen, C. Tu, R. M. Mohamadi, R. K. Nam, A. Hansen, S. S. Sridhar, A. Finelli, N. E. Fleshner, A. M. Joshua, E. H. Sargent, and S. O. Kelley, "Tracking the Dynamics of Circulating Tumor Cell Phenotypes Using Nanoparticle-mediated Magnetic Ranking," *Nature Nanotechnology*, 2017, 12, 274-282.
25. M. Poudineh, M. Labib, S. Ahmed, L. N. Matthew Nguyen, L. Kermanshah, R. M. Mohamadi, E. H. Sargent, and S. O. Kelley, "Profiling Functional and Biochemical Phenotypes of Circulating Tumor Cells Using a Two-Dimensional Sorting Device," *Angewandte Chemie*, 2017, 56, 163-168.
26. M. Poudineh, E. H. Sargent, and S. O. Kelley, "Amplified Micro-Magnetic Field Gradients Enable High-Resolution Profiling of Rare Cell Subpopulations," *ACS Applied Material and Interface*, 2017, 9, 25683–2569.
27. Y. G. Zhou, R. M. Mohamadi, M. Poudineh, L. Kermanshah, S. Ahmed, T. S. Safaei, J. Stojcic, R. K. Nam, E. H. Sargent, and S. O. Kelley, "Interrogating Circulating Microsomes and Exosomes Using Metal Nanoparticles," *Small*, 2016, 12, 727-732.

28. A. T. Sage, J. D. Besant, L. Mahmoudian, M. Poudineh, X. Bai, R. Zamel, M. Hsin, E. H. Sargent, M. Cypel, M. Liu, S. Keshavjee, and S. O. Kelley, “Fractal Circuit Sensors Enable Rapid Quantification of Biomarkers for Donor Lung Assessment for Transplantation,” *Science Advances*, 2015, 1, e1500417.
29. M. Poudineh, R. Mohamadi, A. Sage, L. Mahmoudian, E. H. Sargent, and S. O. Kelley, “Three-Dimensional, Sharp-Tipped Electrodes Concentrate Applied Fields to Enable Direct Electrical Release of Intact Biomarkers from Cells,” *Lab on a Chip*, 2014, 14, 1785-1790.
30. Y. Wan, Y. Zhou, M. Poudineh, T. S. Safaei, R. M. Mohamadi, E. H. Sargent, and S. O. Kelley, “Highly Specific Electrochemical Analysis of Cancer Cells using Multi-Nanoparticle Labeling,” *Angewandte Chemie*, 2014, 53, 13361-13365.
31. Y. Zhou, Y. Wan, A. Sage, M. Poudineh, and S. O. Kelley, “Effect of Microelectrode Structure on Electrocatalysis at Nucleic Acid-Modified Sensors,” *Langmuir*, 2014, 30, 14322-14328.
32. B. Lam, R. D. Holmes, J. Das, M. Poudineh, A. Sage, E. H. Sargent, and S. O. Kelley, “Optimized Templates for Bottom-Up Growth of High-Performance Integrated Biomolecular Detectors,” *Lab on a Chip*, 2013, 13, 2569-2575.
33. M. Poudineh, Z. Sanaee, A. Gholizadeh, S. Soleimani-Amiri, and S. Mohajerzadeh, “Highly Ordered Sub 50 nm Silicon Nanowire Formation Using a High Precision Top-Down Process,” *IEEE Transactions on Nanotechnology*, 2013, 12, 712-718.
34. Z. Sanaee, M. Poudineh, M. Abdolahad, and S. Mohajerzadeh, “High Aspect Ratio Micro- and Nano-Machining of Silicon Using Time-multiplexed Reactive Ion Etching,” *Journal of micromachining and microengineering*, 2011, 21, 125012.

Conference Presentations

The trainees supervised by the applicant are in bold font. The presenter is underlined.

1. **F. Keyvani**, **H. Zheng**, **M. R. Kaysir**, **D. Mantaila**, and M. Poudineh, “A Universal Hydrogel Microneedle for on-Site Detection of Small Molecules, Proteins, and Ribonucleic Acids,” *Electrochemical Society*, Oral Presentation, Boston, MA, 2023.
2. **H. Abouali**, **S. Srikant**, N. Barra, J. Schertzer, and M. Poudineh, “Design and Development of a Real-time Monitoring Microfluidic Platform for Multiplexed Insulin and Glucagon Detection,” *Gordon Research Conference*, Poster Presentation, Tuscany, Italy, 2023.
3. **P. GhavamiNejad**, A. GhavamiNejad, and M. Poudineh, “A Minimally-Invasive Hydrogel-Based Microneedle Sensor for Non-Enzymatic Monitoring of Glucose,” *Diabetes Canada Conference*, Poster presentation, Calgary, AB, 2022.
4. **H. Zheng** and M. Poudineh, “Hydrogel Microneedle-Assisted Assay Integrating Aptamer Probes and Fluorescence Detection for Reagentless Biomarker Quantification,” *Network for Sustainable Nanotechnology (N4SNano)*, Waterloo, ON, 2022.
5. **F. Keyvani**, **N. Debnath**, and M. Poudineh, “Integrated Microfluidic Electrochemical Biosensor for Cervical Cancer Detection at Point of Care Testing,” *Network for Sustainable Nanotechnology (N4SNano)*, Waterloo, ON, 2022.
6. **H. Zheng** and M. Poudineh, “Hydrogel Microneedle-Assisted Assay Integrating Aptamer Probes and Fluorescence Detection for Reagentless Biomarker Quantification,” *Canadian Society for Chemical Engineering, Vancouver*, BC, 2022,
7. **A. Pil-Ali**, S. Adnani, P. Gavirneni, S. Shin, B. Sadeghimakki, M. Poudineh, W. Wong, and K. S. Karim, “Self-Aligned Fabrication of High-Aspect Ratio High-Resolution X-Ray Gratings,” *SPIE Medical Imaging*, San Diego, CA, 2022.

8. A. Pil-Ali, M. Soltani, S. Adnani, M. Kayaharman, M. Poudineh, B. Cui, and K. S. Karim, "Improving Adhesion Quality of SU-8 to Gold Thin Film for Absorption Grating Fabrication in X-Ray Phase-Contrast Imaging," *SPIE Medical Imaging*, San Diego, CA, 2022.
9. **P. GhavamiNejad**, K. Dhingra, A. GhavamiNejad, and M. Poudineh, "A Hydrogel Microneedle-Based Biosensor for Continuous, Real-Time, and Enzyme-Less Glucose Measurement," *MicroTAS Conference*, Poster presentation (virtual), Palm Spring, CA, 2021.
10. **H. Zheng**, A. GhavamiNejad, and M. Poudineh, "A Hydrogel Microneedle-Based Biosensor Integrating Aptamer Probes and Fluorescence Detection for Biomarker Quantification," *MicroTAS Conference*, Poster presentation (virtual), Palm Spring, CA, 2021.
11. **H. Abouali**, **S. A. Hosseini**, **S. Srikant**, and M. Poudineh, "A High Yield, High Purity Blood Plasma Generator Enabling Cancer Biomarker Analysis," *IEEE Nanotechnology Materials and Devices Conference*, Oral presentation (virtual), Vancouver, BC, 2021.
12. M. Poudineh, M. Labib, Z. Wang, E. H. Sargent, S. O. Kelley, and H. T. Soh, "Next-Generation Enabling Technologies for Diagnosing Disease and Monitoring Therapy," *Micro- and Nanotechnologies for Medicine Workshop*, Poster presentation, Los Angeles, CA, 2019.
13. M. Poudineh, Z. Wang, M. Labib, M. Ahmadi, L. Zhang, J. Das, S. Ahmed, S. Angers, and S. O. Kelley, "Nanostructured Architectures Enable Efficient Differentiation of Mesenchymal Stem Cells Towards Neurogenesis Lineages," *Lab-on-a-Chip and Microfluidics World Congress*, Poster presentation, San Diego, CA, 2018.
14. M. Poudineh, M. Labib, E.H. Sargent, and S.O. Kelley, "Two-Dimensional Profiling of Cancer Cell Subpopulations" *MicroTAS Conference*, Poster presentation, Savannah, GA, 2017.
15. M. Poudineh, P. M. Aldridge, S. Ahmed, C. Tu, R. M. Mohamadi, E. H. Sargent, and S. O. Kelley, "Phenotypic Profiling of Circulating Tumor Cells Using Magnetic Ranking Cytometry" *Next Generation Dx Summit Conference*, Poster presentation, Washington, DC, 2016.
16. M. Poudineh, P. M. Aldridge, S. Ahmed, L. Kermanshah, C. Tu, R. M. Mohamadi, E. H. Sargent, and S. O. Kelley, "Tracking the Dynamics of Circulating Tumor Cell Phenotypes Using Nanoparticle-mediated Magnetic Ranking" *Ontario on a Chip Conference*, Oral presentation, Toronto, ON, 2016.
17. M. Poudineh, S. Ahmed, L. Kermanshah, P. M. Aldridge, R. M. Mohamadi, E. H. Sargent, and S. O. Kelley, "Amplified Micro-magnetic Field Gradients Enable High Resolution Profiling of Circulating Tumor Cell Subpopulations" *Gordon Research Conference*, Poster presentation, Mount Snow West Dover, VT, 2015.
18. M. Poudineh, R. M. Mohamadi, A. Sage, L. Mahmoudian, E. H. Sargent, and S. O. Kelley, "Three-Dimensional, Sharp-Tipped Electrodes Concentrate Applied Fields to Enable Direct Electrical Release of Intact Biomarkers from Cells," *Ontario on a Chip Conference*, Poster presentation, Toronto, ON, 2014.
19. M. Poudineh, R. M. Mohamadi, A. Sage, L. Mahmoudian, E. H. Sargent, and S. O. Kelley, "Rapid Continuous Electrical Lysis of Bacteria on Structured Electrodes Preserves RNA Integrity." *MicroTAS Conference*, Poster presentation, San Antonio, TX, 2014.
20. M. Poudineh, Z. Sanaee, S. Soleimani-Amiri, A. Gholizadeh, and S. Mohajerzadeh, "An Effective Top-down Process for Fabrication of Silicon Nano-rods," *MRS Fall Meeting*, 2012.
21. Z. Sanaee, M. Poudineh, M. Mehran, and S. Mohajerzadeh, "High Aspect Ratio Deep Si Etching of Micro/Nano Scale Features with SF₆ /H₂/ O₂ Plasma, in a Low Plasma Density Reactive Ion Etching System," *Nanotech*, Vol. 2, p 325-328, 2011.

22. Z. Sanaee, M. Poudineh, M. Mehran, and S. Mohajerzadeh, "Development of a Novel Technique for Silicon Vertical Etching in Micro/Nano Scale with SF₆/H₂/O₂ Plasma and in Low Plasma Density," *ICEE*, Poster presentation, Iran, 2011.
23. Z. Sanaee, S. Azimi, M. Poudineh, S. Mohajerzadeh, and A. Sandoughsaz, "Ultra-high Aspect Ratio High Speed Silicon Nanowire and Three-dimensional Formation Using a Hydrogen-assisted Deep Reactive Ion Etching," *AVS*, Poster presentation, USA, 2011.
24. Z. Sanaee, M. Poudineh, and S. Mohajerzadeh, "Fabrication of Silicon Nano-needles Suitable for Biological Applications," *E-MRS Fall Meeting*, Poster presentation, 2012.
25. Z. Sanaee, M. Poudineh, and S. Mohajerzadeh, "High Precision, High-Rate Silicon Etching Process for Nano-fabrication," *MME*, Poster presentation, 2012.

INVITED TALKS & SEMINARS

1. "Advanced Technologies for Diagnosis, Monitoring, and Understanding of Diseases," *John Hopkins University*, Baltimore, MD, USA, 10/2023.
2. "Advanced Technologies for Diagnosis, Monitoring, and Understanding of Diseases," *New York University*, New York, NY, USA, 09/2023.
3. "Advanced Technologies for Diagnosis, Monitoring, and Understanding of Diseases," *Ontario Symposium on Micro and Nanotechnology*, Kingston, ON, Canada, 08/2023.
4. "Next-Generation Enabling Technologies for Disease Diagnosis and Therapeutic Monitoring," *Electrochemical Society (ECS)*, Boston, MA, USA, 05/2023.
5. "Advanced Technologies for Diagnosis, Monitoring, and Understanding of Diseases," *University of California San Diego*, San Diego, CA, USA, 05/2023.
6. "Advanced Technologies for Diagnosis, Monitoring, and Understanding of Diseases," *University of South California*, Los Angeles, CA, USA, 05/2023.
7. "Advanced Technologies for Diagnosis, Monitoring, and Understanding of Diseases," *University of California Los Angeles*, Los Angeles, CA, USA, 05/2023.
8. "Advanced Technologies for Diagnosis, Monitoring, and Understanding of Diseases," *University of California Berkeley*, Berkeley, CA, USA, 05/2023.
9. "Advanced Technologies for Diagnosis, Monitoring, and Understanding of Diseases," *Canadian Society for Chemistry (CSC)*, Vancouver, BC, Canada, 05/2023.
10. "Advanced Technologies for Improving Diabetes Management and Study," *Diabetes Canada*, Calgary, AB, Canada, 11/2022.
11. "Next-Generation Enabling Technologies for Health Monitoring," *Canadian Society for Chemical Engineering*, Vancouver, BC, Canada 10/2022.
12. Next-Generation Enabling Technologies for Health Monitoring, *Electrochemical Society (ECS)*, Atlanta, GA, USA, 10/2022.
13. "Next-Generation Enabling Technologies for Health Monitoring," *Network for Sustainable Nanotechnology (N4SNano)*, Waterloo, ON, Canada 08/2022.
14. "Next-Generation Enabling Technologies for Health Monitoring," *Nano Series Conference*, 06/2022.
15. "Next-Generation Enabling Technologies for Health Monitoring," *Translational Biomedical Engineering*, Canada, 03/2022.
16. "Next-Generation Enabling Technologies for Health Monitoring," *Rutgers University*, New Jersey, NY, USA, 03/2022.

17. "Next-Generation Enabling Technologies for Health Monitoring," *Rice University*, Houston, Tx, USA, 01/2022.
18. "Micro-Enabled Technologies for Diabetes Monitoring," *Canadian Society for Chemical Engineering*, Canada, 11/2021.
19. "Next-Generation Enabling Technologies for Diagnosing Disease and Monitoring Therapy," *Distinguished Lecture Series*, ETH Zurich, Switzerland, 05/2021.
20. "Continuous Detection of Glucose and Insulin in Live Animals," *Stanford Diabetes Research Seminar*, USA 05/2021.
21. "Next-Generation Enabling Technologies for Diagnosing Disease and Monitoring Therapy," Sharif University of Technology, Tehran, Iran, 12/2020.
22. "Next-Generation Enabling Technologies for Diagnosing Disease and Monitoring Therapy," *IEEE Iran Section*, 12/2020.
23. "Next-Generation Enabling Technologies for Diagnosing Disease and Monitoring Therapy," *Rochester Institute of Technology*, USA, 09/2020.
24. "Next-Generation Enabling Technologies for Diagnosing Disease and Monitoring Therapy," *Emerging Trends of Bioengineering Technologies webinar series*, Tehran, Iran, 08/2020.
25. "Profiling cells inside and out using magnetic nanoparticles," Smart Materials for Biological Sensing, *Pittcon*, Philadelphia, PA, USA, 03/2019.
26. "Next-Generation Enabling Technologies for Biomedical Engineering Applications," *Carnegie Mellon University*, Pittsburgh, PA, USA, 03/2019.
27. "Next-Generation Enabling Technologies for Biomedical Engineering Applications," *University of Alberta*, Edmonton, AB, Canada, 06/2018.
28. "Next-Generation Enabling Technologies for Biomedical Engineering Applications," *University of Waterloo*, Waterloo, ON, Canada, 03/2018.
29. "Next-Generation Enabling Technologies for Biomedical Engineering Applications," *Delft University of Technology*, Delft, Netherlands, 12/2017.
30. "Next-Generation Enabling Technologies for Biomedical Engineering Applications," *Stanford University*, Stanford, CA, USA 10/2017.
31. "On-Chip Phenotypic Profiling of Circulating Tumor Cells," *York University*, Toronto, ON, Canada, 07/2017.
32. "On-Chip Phenotypic Profiling of Circulating Tumor Cells," *Ryerson University*, Toronto, ON, Canada 05/2017.

THESES

The trainees supervised by the applicant are in bold font.

1. **H. Zheng**, "An Optical, Microneedle-based Biosensor Integrating Aptamer Probes for Biomarker Detection in Skin Interstitial Fluid," Master's Thesis, University of Waterloo, 2022.
2. **H. Aghamohammadi**, "Optimization of a Microfluidic Assay Computationally and Experimentally for Rapid and Sensitive Detection of Toxins in Water Samples," Master's Thesis, University of Waterloo, 2022.
3. M. Poudineh, "On-chip Manipulation and Sorting of Cancer Cells for Next-generation Diagnostic Technologies," PhD Thesis, University of Toronto, 2016.

- M. Poudineh, “High Precision High Resolution Silicon Etching for Fabrication of Nano-Rod Arrays,” Master’s Thesis, University of Tehran, 2012.

PATENTS

*The trainees supervised by the applicant are in **bold font**.*

- M. Poudineh, **F. Keyvani**, **N. Debnath**, “Microcapillary Device, Electrochemical Biosensor, and Devices and Methods Thereto,” US patent application (29/04/2022).
- J. Deglint, M. Poudineh, K. Thomas, **H. Aghamohammadi**. Rapid Detection of Multiple Toxins Using a Microfluidic Device. *Provisional patent application* (01/2022).
- M. Poudineh, A. GhavamiNejad, **H. Zheng**, and **F. Keyvani**, “Hydrogel Microneedles for Biosensing,” US patent application, serial# 17/962,055, filed on 07/10/2022, claiming priority to the US provisional patent application serial# 63/253,781, filed on 08/10/2021. *Provisional patent application* (7/10/2021).
- M. Poudineh, A. GhavamiNejad, **P. Ghavami Nejad**, and **S. Odinotski**, “Microneedle Electrodes for Biosensing,” US patent application, serial# 17/963,646, filed on 11/10/2022, claiming priority to the US provisional patent application serial# 63/253,739, filed on 08/10/2021. *Provisional patent application* (7/10/2021).
- H. T. Soh, M. Poudineh, J. Pan, Continuous Real-Time Monitoring of Biomolecules in Live Subjects, *Provisional patent application*, WO/2021/146612 (Jan 15, 2021).
- S. O. Kelly, E. H. Sargent, M. Poudineh, R. Mohamadi, and P. Aldridge, Device for Magnetic Profiling of Particles in a Flow, *Issued patent*, US10809180B2 (20/10/2022), US20180292305A1 (11/10/2018), and WO2017054075A1 (27/09/2016).

TEACHING

Term	Subject Number	Topic	Role/Evaluation	#of Students
Winter 2020	NE 487 (U)	Nanobiotechnology and Microfluidic System	Instructor/4.7 out of 5	8
Fall 2020	ECE 730 (G)	Biosensing: Fundamentals and Applications	Course Developer & Instructor/4.4 out of 5	14
Winter 2021	NE 487 (U)	Nanobiotechnology and Microfluidic Systems	Instructor/4.2 out of 5	21
Fall 2021	NE 381 (U)	Introduction to Nanoscale Biosystems	Instructor/4 out of 5	44
Winter 2022	NE 487 (U&G)	Nanobiotechnology and Microfluidic Systems	Instructor/4.2 out of 5	31
Winter 2022	ECE 730 (G)	Biosensing: Fundamentals and Applications	Instructor/4.7 out of 5	13
Fall 2022	NE 381 (U)	Introduction to Nanoscale Biosystems	Instructor/4.3 out of 5	64
Winter 2023	NE 487 (U&G)	Nanobiotechnology and Microfluidic Systems	Instructor/4.1 out of 5	30
Winter 2023	ECE 730 (G)	Biosensing: Fundamentals and Applications	Instructor/4.9 out of 5	10

POSTDOCTORAL/STUDENT SUPERVISION AT WATERLOO

Trainee	Degree	Period	Current Position	Scholarships/Awards
Erfan Shirzadi	PDF	04/2023 –	PDF	AMTD Waterloo Global Talent Postdoctoral Fellowships
Irfani Ausri	PDF	06/2022 –	PDF	
Sadegh Sadeghzadeh	PhD	01/2023 –	Graduate Student	
Shadi Vajdi	PhD/co-advisor	01/2023 –	Graduate Student	
Hanjia Zhang	PhD	09/2022 –	Graduate Student	
Pouyan Keshavarz	PhD/co-advisor	11/2021 –	Graduate Student	
Fatemeh Keyvani	PhD	05/2021 –	Graduate Student	Ontario Graduate Scholarship (OGS)
Peyman GhavamiNejad	PhD	01/2021 –	Graduate Student	
Hesam Abouali	PhD	09/2020 –	Graduate Student	
Subhamoy Biswas	MSc	09/2022 –	Graduate Student	Waterloo International Master's Award of Excellence (IMAE)
Sanjana Srikant	MSc	01/2022 –	Graduate Student	
Joshua Khatri	BSc	09/2023 –	Undergraduate Student	NSERC Undergraduate Research Award
Julia Kehl	BSc	09/2023 –	Undergraduate Student	NSERC Undergraduate Research Award
Justin Mehta	BSc	09/2023 –	Undergraduate Student	
Sarah Schneider	BSc	09/2023 –	Undergraduate Student	
Jenny Chauhan	BSc	09/2023 –	Undergraduate Student	
Braeden MacDougall	BSc	05/2023 –	Undergraduate Student	
Oliver Aramini	BSc	05/2023 –	Undergraduate Student	
Owen Michael Radford Carruthers	BSc	05/2023 –	Undergraduate Student	
Elham Azizi	MSc	04/2023 –	Lab Manager	
Md Rejvi Kaysir	PDF/co-advisor	01/2022 – 12/2022	Associate Professor (Khulna University of Engineering & Technology)	

Nandini Debnath	PDF	03/2021 – 05/2022	R&D Engineer (Applied Nanotools)	
Hamid Aghamohammadi	MSc	09/2020 – 09/2022	R&D Engineer (NeoVentures Biotechnology Inc.)	Waterloo International Master's Award of Excellence (IMAE)
Hanjia Zhang	MSc	09/2020 – 05/2022	Graduate Student (Waterloo)	
Agosh Saini	BSc	09/2022 – 09/2023	Graduate Student	
Michelle Dieu Thao Huynh	BSc	05/2022 – 04/2023	Graduate Student	NSERC Undergraduate Research Award
Megan Dawson	BSc	01/2022 – 04/2023	Undergraduate Student	
Hannah Bernstein	BSc	01/2022 – 04/2023	Graduate Student	
Victoria Ho	BSc	01/2022 – 04/2023	Undergraduate Student	
Jeriann Hsiao	BSc	01/2022 – 04/2023	Product Management	
Dragos Mantaila	BSc	05/2022 – 12/2022	Undergraduate Student	NSERC Undergraduate Research Award
Simone Abdillahi	BSc	04/2022 – 08/2022	Undergraduate Student	NSERC Undergraduate Research Award
Sarah Odinotski	BSc	01/2021 – 03/2022	Graduate Student (Waterloo)	Waterloo Co-op of the Year Award; NSERC Undergraduate Research Award
Simon Frew	BSc	01/2021 – 03/2022	Graduate Student (Waterloo)	
Lisa Emaline Devlin	BSc	01/2021 – 03/2022	Product Engineer (Siemens Healthineers)	
Jessie Elizabeth Christie	BSc	01/2021 – 03/2022	Product Designer (Accedo.tv)	
Lisa Krygsman	BSc	01/2020 – 05/2020	System Integration Engineer (Nicoya)	
Mahmoud Ayman Saleh	Visiting Student/MSc	07/2021 – 05/2022	Graduate Student	
Melisa Khalag	MSc	01/2022 – 03/2023	Lab Manager	

STUDENT MENTORSHIP OUTSIDE WATERLOO

Trainee	School	Degree	Year	Current Positions
Sharon Newman	Stanford University	PhD	2019	Graduate Student (Stanford)
Zongjie Wang	University of Toronto	PhD	2017	PDF (Northwestern)

Carmen Tu	University of Toronto	BSc	2016	Product Manager
Matthew Nguyen	University of Toronto	BSc	2016	Graduate Student (University of Toronto)
Sanjana Srikant	University of Toronto	BSc	2015	Graduate Student (Waterloo)

DOCTORAL & MASTER'S THESIS COMMITTEES

- PhD Thesis Committee Member, Fatemeh Samaeifar, University of Waterloo, 2022 (Advisor: Hany Aziz).
- PhD Thesis Committee Member, Sahar Adnani, University of Waterloo, 2023 (Advisor: Karim Karim).
- PhD Thesis Committee Member, Md. Masud Rana, “Organic-Inorganic Halide Perovskite based Highly Efficient Flexible Nanogenerator,” University of Waterloo, 2023 (Advisor: Dayan Ban).
- PhD Thesis Committee Member, Pei Li, University of Waterloo, 2023, (Advisor: Shirley Tang).
- PhD Thesis Committee Member, Atefeh Ghorbani, University of Waterloo, 2022 (Advisor: Hany Aziz).
- PhD Thesis Committee Member, Robyn Klassen, University of Waterloo, 2023 (Advisor: Alfred Yu).
- PhD Thesis Committee Member, Irfani Ausri, “Carbon Nanotube Biohybrid Based Wearable Sensor,” University of Waterloo, 2022 (Advisor: Shirley Tang)
- PhD Thesis Committee Member, Amid Shakeri, “Development of Robust Biofunctional Interfaces for Application in Self-Cleaning Surfaces, Lab-on-a-Chip System, and Diagnostics,” McMaster University, 2021 (Advisor: Tohid Didar).
- Master’s Thesis Committee Member, Mahmoud Ayman Saleh, “Electrochemical Sensors and Biosensors of Biomarkers and Therapeutic Agents Detection,” American University of Cairo, 2022 (Advisor: Nageh Allam).
- Master’s Thesis Committee Member, Sarah Labas, “Studying DNA-Target Interactions Using Gold Nanoparticles,” University of Waterloo, 2021 (Advisor: Juewen Liu).
- PhD Background Exam Committee Member, Robyn Klassen, University of Waterloo, 2021 (Advisor: Alfred Yu).
- PhD Proposal Committee Member, Md. Masud Rana, “Organic-Inorganic Halide Perovskite based Highly Efficient Flexible Nanogenerator,” University of Waterloo, 2021 (Advisor: Dayan Ban).
- PhD Background Exam Committee Member, Md Fahim Al Fattah, University of Waterloo, 2021 (Advisor: Dayan Ban).
- PhD Background Exam Committee Member, Anni Pan, University of Waterloo, 2020 (Advisor: Alfred Yu).
- PhD Background Exam Committee Member, Md. Masud Rana, University of Waterloo, 2020 (Advisor: Dayan Ban).
- PhD Background Exam Committee Member, Atefeh Ghorbani, University of Waterloo, 2020 (Advisor: Hany Aziz).
- PhD Background Exam Chair, Michael Riad, University of Waterloo, 2022 (Advisor: George Shaker & Raafat Mansour).

- PhD Background Exam Chair, Behkish Nassirzadeh, University of Waterloo, 2022 (Advisor: Vijay Ganesh).
- PhD Background Exam Chair, Ahmad Sayed, University of Waterloo, 2022 (Advisor: Omar Ramahi & George Shaker).
- PhD Background Exam Chair, Peng Zhang, University of Waterloo, 2020 (Advisor: Ali Safavi-Naeini & Raafat Mansour).
- PhD Background Exam Chair, Wenhan Hu, University of Waterloo, 2020 (Advisor: Bo Cui).
- PhD Background Exam Chair, Seyed Ali Hosseini Farahabadi, University of Waterloo, 2020 (Advisor: Ali Safavi-Naeini).
- PhD Background Exam Chair, Afsaneh Hojjati-Firoozabadi, University of Waterloo, 2020 (Advisor: Ali Safavi-Naeini).
- PhD Background Exam Chair, Milad Entezami, University of Waterloo, 2020 (Advisor: Ali Safavi-Naeini)

PROFESSIONAL ACTIVITIES

- Editor in *npj Women's Health*, 06/2023.
- Member, Organizing Committee, *Network for Sustainable Nanotechnology (N4SNano) conference*, University of Waterloo, 08/2022.
- Member, Biomedical Engineering Undergraduate Program Committee, University of Waterloo (09/2021-present).
- Member, Engineering Faculty Council, University of Waterloo, (01/2022-present).
- Associate Member, CIHR College of Reviewers (09/2022-present).
- Journal Article Review: *Nature Biomedical Engineering*, *Nature Communication*, *Advanced Materials*, *Lab on a Chip*, *Advanced Healthcare Materials*, *Analytical Chemistry*, *ACS Sensors*, *Canadian Medical and Biological Engineering Society*, etc.
- Grant Review: MITACS, NSERC, CIHR, NIH agencies, Waterloo Internal Funding (CIHR-RFI, Graham Seed Funding, CBB Seed Funding).