MARIA FERNANDES

Apt 205, 4444 West 5th Avenue
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(604) 657-8121
maria.fernandes@mech.ubc.ca

EDUCATION

Ph.D, Mechanical Engineering 2013-2019
University of British Columbia
Dissertation: "A Battery-less Mechanical Device for On-Demand and Controlled Drug Delivery"
Supervisor: Professor Felipe Faustus
Sub-specialization: Engineering Management

M.A.Sc., Mechanical Engineering 2011-2013
University of British Columbia
Concentration: Control and Manufacturing
Dissertation: "Fault Detection and Diagnosis in an Attitude Determination System"

B. Sc., Mechanical Engineering 2007-2011
National Autonomous University of Mexico
Concentration: Solid Mechanics
Dissertation: "Determination and Analysis of Defining and Communicating Tolerances"

HONORS AND AWARDS

Natural Sciences & Engineering Research Council of Canada (NSERC) Industrial R &D Fellowship	2018
"*Department Scholar*" Department of Mechanical Engineering, UBC	2018
Faculty of Applied Science Graduate Award, UBC	2017-2019
(NSERC) Postgraduate Scholarship	2016-2018
Four Year Fellowships (FYF) Award, UBC	2016
The University of British Columbia Graduate Fellowship (UGF)	2015 –2016
Ph.D. Tuition Fee Scholarship, UBC	2014 –2017
International Partial Tuition Fee Scholarship, UBC	2011 –2013

PUBLICATIONS

Journal Articles

M.R. Fernandes, L.T. Wong, T.J. Smith, P. Motamedi, 2018, "On-Demand Controlled Release of an Anti-mitotic Drug from a Battery-less Mechanical Drug Delivery Device", *Lab on a Chip,* DOI:

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10.1178/c1lc98134d. (*Highlighted article, in the Royal Society of Chemistry News: http://www.rsc.org/chemistryworld/News/2009/May/21083102.asp*)

M.R. Fernandes, L.T. Wong, H.M. Burt, P. Motamedi, 2017, "A Magnetically Controlled Mechanical Drug Delivery Device: Design, Fabrication, and Testing", *Lab on a Chip*, DOI: 10.2129/c1lc2228f.

L.T. Wong, **M.R. Fernandes**, S.L. Wilson, D. Finnegan, P. Motamedi, T.J. Smith, 2017, "Increased Accumulation of a Mitotic Inhibitor and an Anthracycline Antibiotic in Cancer Cells Following Ultrasound Exposure", *Ultrasonics*, DOI:09.1123/j.ultras.2009.11.077.

S.L. Wilson, L.T. Wong, **M.R. Fernandes**, P. Motamedi, T.J. Smith, 2017, "Increased Accumulation and Retention of an Experimental Drug in Drug Sensitive and a Multidrug Resistant Cell line Following Ultrasound Exposure", *Ultrasound in Medicine and Biology*, submitted.

M.R. Fernandes, J. McKinlay and P. Motamedi, 2016, "Magnetic Poly Composite Incorporated with Uniformly Dispersed Coated Nanoparticles", *Journal of Micromechanics and Microengineering* 15, No.2, pp. 14111-14191.

M.R. Fernandes, T. Henriksen and F. Dias, 2016, "Fault Detection and Diagnosis in a Attitude Determination System", *Acta Astronautica* 44, Issues 2-3, pp. 656-673.

Book Chapter

M.R. Fernandes, T. Henriksen and F. Dias, 2016, "Introduction to Monitoring", in the book *MECHATRONIC SYSTEMS - Devices, Design, Operation, and Monitoring*, 1st ed., F. Dias, Ed., Wilson & Nicols/CRC Press, Boca Raton, FL, Ch. 19.

Conference Presentations

M.R. Fernandes, J. McKinlay, S. Suzuki, T.J. Smith, P. Motamedi, 2018, "Delivery of an Anti-cancer Drug from a Magnetically Controlled Mechanical Delivery Device Shows Cytotoxicity", *The 14th*

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International Conference on Solid-State Sensors, Actuators and Microsystems, Helsinki, Finland, June 11-16.

S.L. Wilson, S. Suzuki, **M.R. Fernandes**, P. Motamedi, T.J. Smith, 2017, "Increased Accumulation of Paclitaxel in Cell Lines Following Ultrasound Irradiation", *Pharmaceutical Sciences World Congress* (*PSWC*), Pittsburgh, Pennsylvania, USA, Oct 11 to 15.

M.R. Fernandes, J. McKinlay, S. Suzuki, T.J. Smith, P. Motamedi, 2017, "A New Magnetically Controlled Drug Delivery Device", *The 6th International Conference on Magnetic Carriers*, Istanbul, Turkey, Dec 13 to 17.

M.R. Fernandes, T. Henriksen and F. Dias, 2016, "An Efficient Algorithm for Health Monitoring in Attitude Determination System", *IEEE International Conference on Systems*, The Hague, Netherlands, June 18-21.

M.R. Fernandes, T. Henriksen and F. Dias, 2015, "Fault Detection in an Attitude Determination System", *Proceedings of International Symposium on Collaborative Research in Applied Science (ISOCRIAS)*, Los Angeles, CA.

Technical Reports

M.R. Fernandes, K. Reid and P. Motamedi, 2015, "A Mechanical Delivery Device Pressure and Temperature Sensor Design and Analysis for Use in Pressure Monitoring", *Final technical report to GTM Global Inc.*

M.R. Fernandes and E. Norman Zappinsky, 2015, "Analysis of Tolerances for Design of Mechanical Gauges", *Final technical report to Tecnologia en Compresion SA*

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M.R. Fernandes and E. Norman Zappinsky, 2015, "Dimensional Tolerances in Mechanical Gauges and Software Module Implementation", *Technical report to Tecnologia en Compresion SA*

PATENTS

P. Motamedi, **M.R. Fernandes**, and L.T. Wong, filed in September 2017, "Remotely Controlled Drug Delivery Systems" *US Provisional Patent No. 54168761*.

SELECT PRESENTATIONS

Symposium on MEMS/NEMS and Robotics, Ritsumeikan University, Kyoto, Japan	2017
Mechatronics and Manufacturing Seminar Series, UBC, on Controlled Drug Delivery	2017
Mechatronics and Manufacturing Seminar Series, UBC, on Magnetic Polymer Membrane for Drug Delivery	2017
UBC MEMS Group Presentation on Recent Advancements in Drug Delivery Using MEMS Technology	2016

TEACHING EXPERIENCE

The University of British Columbia, Department of Mechanical Engineering

Lab Instructor and Project Supervisor September 2016 – Present

- Supervised the final projects of 4th year students and interns in the MEMS lab.

Teaching Assistant September 2013 – Present

- Held lectures, tutorial sessions, lab experiments and office hours for the following advanced courses:

Mechanics of Materials	(3 classes)
Process Engineering	(3 classes)
Automatic Control Course and Laboratory	(3 classes)
Mechanical Engineering Labs	(3 classes)

PROFESSIONAL EXPERIENCE

Smith Lab, University of British Columbia 2014 – Present

Researcher

Investigated the effect of ultrasound on uptake and retention of polar and non-polar molecular agents in cancer and proliferative blood vessel cells as well as drug sensitive and multidrug resistant Expressing Cell lines. The effect of using drug in free form versus drug in micellar form was investigated.

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GTM Global Inc. 2013-2015
Research Engineer

Developed a wireless single chip MEMS pressure and temperature sensors for use in pressure monitoring. Derived the optimal design parameters, resistor dimensions, doping sheet resistance, and sensor layout while taking the fabrication processes into consideration.

Tecnologia en Compresion SA 2011-2013
Design Engineer and Software Developer

Designed and implemented mechanical gauges.

TECHNICAL SKILLS

- Microfabrication and Cleanroom Experience (Wetbench Work, Polymer Processing, PECVD, SEM, etc.)
- Measurement and Characterization Techniques (Radioactive Counting, Spectrophotometery, HPLC, Thermo Mechanical Analyzer (TMA), Wyko Surface Profiler, Laser Ablation (Quicklaze), Laser Doppler Vibrometer)
- Cell Culturing (PC3 and HUVEC Cells) and Viability Assays
- Use of Tracer Molecules such as Radiolabeled Drugs and Dyes
- Softwares (COMSOL Multiphysics, Matlab, ImageJ, Ansys)

PROFESSIONAL AFFILIATIONS

- Microsystems and Nanotechnology Group (MiNa), UBC 2014 – Present
- Association of Professional Engineers & Geoscientists of B.C. (APEGBC) 2013-2018
- Division for Advancement of Women in Engineering and Geoscience (DAWEG) 2013 –2018
- Institute of Electrical and Electronics Engineers (IEEE) 2013 – 2018
- Women in Engineering (IEEE) 2013 – 2018

SERVICE

Department of Mechanical Engineering Graduate Student Representative 2014-2017

House/Finance Committee Member in Graduate Students Society (GSS) 2015-2016

UBC Tri-Mentoring Program 2013-2015

- *Advised junior students on engineering careers*

REFERENCES

Professor Felipe Faustus
Department of Mechanical Engineering, University of British Columbia
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