

Saeed Rismani Yazdi

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EDUCATION

September 2015 Present	Ph.D. Candidate Dept. of Chemical Engineering, Queen's University , Kingston, ON, Canada Advisors: Prof. Peter L. Davies and Prof. Brian Amsden Project: Using microfluidics to study bacteria-environment interaction GPA: 4 /4
October 2012 July 2015	M.Sc. in Mechanical Engineering (Industrial Production) Dept. of Mechanical Engineering, Politecnico Di Milano , Milan, Italy Advisor: Prof. Marco Tarabini GPA: 108/110. Ranked first among graduated students in Mechanical Engineering, July 2015. Thesis: Development of parallel and automated microfluidic hanging drop networks for “Body-on-a-Chip” systems. Thesis grade: 7.0/7.0
March 2014 April 2015	Visiting scholar Bio Engineering Laboratory (BEL), Dept. of Biosystems Science and Engineering Swiss Federal Institute of Technology, ETH Zurich , Switzerland Advisor: Prof. Andreas Hierlemann Project: Towards parallel and automated hanging drop networks – integration of a hanging drop pump
June 2013 August 2013	Visiting student Singapore-MIT Alliance for Research and Technology (SMART) BioSyM, National University of Singapore (NUS), Singapore Advisor: Prof. Roger D. Kamm Project: Mechanobiology and microfluidics: Exploring the effects of MMP inhibitor and blebbistatin on breast cancer cell mechanics
September 2006 February 2012	B.Sc. in Mechanical Engineering (Manufacturing and Production) Dept. of Mechanical Engineering, Azad University of Najafabad, Isfahan, Iran GPA: 16.85/20 Advisor: Prof. Mojtaba Kolahdoozan Thesis: Optimization of drilling process for Inconel 718, using experimental tests and finite element modeling. Thesis grade: 19/20

HONORS and AWARDS

- Duncan and Urlla Carmichael Graduate Fellowship, Queen's University, 2016
- Queen's Graduate Award, Queen's University, 2015-2018
- International General bursary, Queen's University, 2015-2018

- Travel grant, Dept. of Chemical Engineering, Queen's University, 2016
- Poster award, Dept. of Chemical Engineering, Queen's University, 2016
- The Chemical and Biological Microsystems Society (CBMS) young researcher grant, 2015
- European Society for Animal Cell Technology (ESACT) travel grant, 2015
- One-year fellowship from Bio Engineering Laboratory, ETH Zurich, Switzerland, 2014
- Thesis-abroad scholarship, Politecnico Di Milano, Italy, 2014
- Diritto allo Studio scholarship, Politecnico Di Milano, Italy, 2014
- Travel grant, Politecnico Di Milano, Italy, 2014
- Research assistant fellowship, Singapore-MIT alliance for research & technology, Singapore, 2013
- Two-years golden scholarship, Dept. of Mechanical Engineering, Politecnico Di Milano, Italy, 2012
- Research grant, reducing tool wear in drilling process, Azad University of Najafabad, Iran, 2010
- Recognized for exceptional scholastic achievement in Dept. of Mechanical Engineering for two consecutive years (2009-2011), & received tuition-waiver scholarship for having GPA in the top 3 in the department, Azad University of Najafabad, Iran

PUBLICATIONS

Manuscripts under Review or in Preparation:

1. **S. Rismani Yazdi**,* P. Agrawal,* E. Morales, C. A. Stevens, L. Oropeza, P. L. Davies, R. D. Oleschuk, C. Escobedo, "*Facile Actuation of Aqueous Droplets on a Superhydrophobic Surface Using Magnetotactic Bacteria*" Submitted to *Analytica Chimica Acta*, 2018. [* Authors contributed equally]
2. C. A. Stevens, S. Guo, T. DR. Vance, **S. Rismani Yazdi**, C. Escobedo, I. K. Voets, P. L. Davies, "*Structural and functional characterization of the binding interaction between an Antarctic diatom and bacteria*" In preparation, 2018.

Refereed Journal Publications: Total citations: 61 (September 2018)

1. **S. Rismani Yazdi**, R. Nosrati, C. A. Stevens, D. Vogel, C. Escobedo, "*Migration of magnetotactic bacteria in porous media*" *AIP Biomicrofluidics*, 2018.
[Featured on the journal website and selected for [featured collections](#)]
[Most Read by FEB 27 2018]
2. **S. Rismani Yazdi**, R. Nosrati, C. Stevens, D. Vogel, P. L. Davies, C. Escobedo, "*Magnetotaxis Enables Magnetotactic Bacteria to Navigate in Flow*" **Small**, 2018.
[Featured on the **front cover** of [issue 5](#)]
[Featured on [Queen's Gazette](#), [Eureka Alert](#), [PHYSORG](#), [ScienceDaily](#), [NanoWerk](#), [MedGadget](#), [NFK](#)]
[Journal impact factor: **9.59**]
[top 5% of all research outputs scored by Altmetric, Dec. 2017]
3. S. Guo, C. A. Stevens, T. DR. Vance, L. L.C. Olijve, L. A. Graham, R. L. Campbell, **S. Rismani Yazdi**, C. Escobedo, M. Bar-Dolev, V. Yashunsky, I. Braslavsky, D. N. Langelaan, S. P. Smith, J. S. Allingham, I. K. Voets, P. L. Davies, "*Structure of a 1.5-MDa adhesin that binds its Antarctic bacterium to diatoms and ice*" **Science Advances**, 2017.
[Featured on [Chemical & Engineering News](#), [Eureka Alert](#), [PHYSORG](#), [Breitbart](#), [United Press International](#), [Scientific American](#), and [Hypercubic](#)]
[Journal impact factor: **11.51**]
4. **S. Rismani Yazdi**, S. Burgel, A. Shadmani, P. T. Misun, A. Hierlemann, O. Frey, "*Adding the 'heart' to hanging drop networks for microphysiological multi-tissue experiments*" **Lab on a Chip**, 2015.
[Featured on the **front cover** of [issue 21](#)]
[Classified as **HOT article**]

[Featured on [Chemistry World](#)*, [ETH website](#), (e) [Science News](#), and [CytoFluidix](#)]
[Journal impact factor: **6.045**]

Comments from experts in the field on this paper:

* Dr. Jan Lichtenberg, InSphero Chief Executive Officer: “**A truly innovative solution for liquid propulsion in open-channel microfluidic systems.**” “The pulsatile nature of the liquid movement is an additional benefit when we think about mimicking flow physics of the human body.”

* Prof. Wouter van der Wijngaart, head of microfluidics and lab on a chip group at the KTH Royal Institute of Technology in Sweden: “**This is one of the most interesting recent developments in the field of microfluidic systems.**” “**This type of system has the potential to become the de facto workhorse in the field of 3D microtissue culturing.**”

5. A. Tay, A. Pavesi, **S. Rismani Yazdi**, C. T. Lim, M. Ebrahimi Warkiani, “*Advances in microfluidics in combating infectious diseases*” **Biotechnology Advances**, 2015. [Journal impact factor: **11.452**]
6. M. Kolahdoozan, F. Azimifar, **S. Rismani Yazdi**, “*Finite element investigation and optimization of tool wear in drilling process of difficult-to-cut nickel-based superalloy using response surface methodology*” *International Journal of Advanced Design and Manufacturing Technology*, 2014.

Refereed Conference Publications/Presentations:

1. **S. Rismani Yazdi**, R. Nosrati, C. A. Stevens, D. Vogel, P. L. Davies, C. Escobedo, “*Controlled and directed navigation of magnetotactic bacteria in strong flows*” The ASME 16th International Conference on Nanochannels, Microchannels, and Minichannels (ICNMM), Dubrovnik, Croatia, 2018. (Oral presentation)
2. **S. Rismani Yazdi**, C. A. Stevens, P. L. Davies, C. Escobedo, “*Microfluidic Platform for Studying Biofilm Formation of Oil-degrading Bacteria*” The Canadian Society for Mechanical Engineering (CSME) International Congress, Toronto, Canada, 2018. (Oral presentation)
3. **S. Rismani Yazdi** “*Magnetotactic bacteria: microscale interactions and macroscale applications*” Queen’s ChemEng Seminar Day, Queen’s University, Kingston, Canada, 2018. (Oral presentation)
4. S. Guo, M. Bar-Dolev, C. A. Stevens, T. DR. Vance, L. LC. Olijve, L. A. Graham, R. L. Campbell, **S. Rismani Yazdi**, C. Escobedo, R. Bernheim, V. Yashunsky, D. Langelaan, S. P. Smith, J. S. Allingham, I. Braslavsky, I. L. Voets, P. L. Davies, “*Structure of a 1.5-MDa ice-binding protein reveals its role in binding bacteria to ice with diatoms*” 3rd Ice-binding protein meeting, Rehovot, Israel, 2017. (Invited oral presentation)
5. C. A. Stevens, S. Guo, M. Bar-dolev, M. Olijive, **S. Rismani Yazdi**, V. Yashunsky, I. Braslavsky, I. K. Voets, C. Escobedo, P. L. Davies, “*Stuck in the middle with you: characterizing the association between two Antarctic microorganisms*” Microbial Adhesion and Signal Transduction Gordon Research Conference, Rhode Island, USA, 2017. (Invited oral presentation)
6. C. A. Stevens, S. Guo, M. Bar-Delov, L. C. Olijve, **S. Rismani Yazdi**, I. K. Voets, I. Braslavsky, C. Escobedo, P. L. Davies, “*Giant adhesin protein helps form a symbiotic bacterium/diatom biofilm on sea ice*” ASM Conference on Mechanisms of Interbacterial Cooperation and Competition, Washington, USA, 2017. (Poster presentation)
7. **S. Rismani Yazdi**, C. A. Stevens, D. Vogel, P. L. Davies, C. Escobedo, “*Microfluidic experiments measure the ability of magnetotactic bacteria to swim against microflows*” 20th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS), Dublin, Ireland, 2016. (Oral presentation)

8. **S. Rismani Yazdi**, D. Vogel, C. A. Stevens, R. Nosrati, P. L. Davies, C. Escobedo, “*Magnetotaxis enables the magnetotactic bacteria to navigate in strong flows*” 2nd Annual Queen’s/RMC ChemEng Research Day, Queen’s University, Kingston, Canada, 2016. (Poster presentation, Best poster presentation award)
9. C. A. Stevens, **S. Rismani Yazdi**, S. Guo, M. Bar-Dolev, I. Braslavsky, C. Escobedo, P. L. Davies, “*Using microfluidics to study biofilm formation and disruption with an ice-binding bacterium*” CRYO2016: The 53rd Annual Meeting of the Society for Cryobiology, Ottawa, Canada, 2016. (Oral presentation).
10. **S. Rismani Yazdi**, C. A. Stevens, P. L. Davies, C. Escobedo, “*Using microfluidics to study biofilm formation and disruption*” 26th Anniversary World Congress on Biosensors, Gothenburg, Sweden, 2016. (Poster presentation)
11. P. Misun, **S. Rismani Yazdi**, D. Fluri, J. Kelm, K. Renggli, A. Hierlemann, O. Frey, “*Microtissues Meet Microfluidics – Hanging-Drop Networks*”, Roche Symposium – Organs on a Chip: Is the end of animal testing near? Basel, Switzerland, 2016. (Oral presentation)
12. P. Misun, **S. Rismani Yazdi**, S. Bürgel, D. Fluri, J. Kelm, K. Renggli, A. Hierlemann, O. Frey, “*Microphysiological Fluidic Hanging Drop Network for Multi-Tissue Interaction and Analysis*”, Organ-on-a-Chip World Congress & 3D-Cultures, Boston, MA, USA, 2016. (Oral presentation)
13. **S. Rismani Yazdi**, S. Bürgel, A. Shadmani, A. Hierlemann, O. Frey, “*Integrated pump for hanging-drop networks controlled by human iPS-derived cardiac microtissue*” 19th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS), Gyeongju, Korea, 2015. (Oral presentation)
14. **S. Rismani Yazdi**, A. Shadmani, A. Hierlemann, O. Frey, “*Microfluidic hanging-drop platform for parallel closed-loop multi-tissue experiments*” 28th IEEE International Conference on Micro Electro Mechanical Systems (MEMS), Estoril, Portugal, 2015. (Poster presentation)
15. **S. Rismani Yazdi**, A. Shadmani, A. Hierlemann, O. Frey, “*integration of a peristaltic micropump into microfluidic hanging drop networks*” 40th International Conference on Micro and Nano Engineering (MNE), Lausanne, Switzerland, 2014. (Oral presentation)
16. **S. Rismani Yazdi**, A. Torkzadeh, C.A. Biffi, “*Cost modeling of laser and abrasive water jet cutting processes*” 3rd International Conference on Mechanical Engineering and Mechatronics (ICMEM), Prague, Czech Republic, 2014. (Oral presentation)
17. **S. Rismani Yazdi**, F. Azimifar, E. Rismani Yazdi, M. Kolahdoozan, “*Finite element modeling and optimization of tool wear in drilling process of Inconel 718*” ASME International Mechanical Engineering Congress & Exposition, USA, 2012. (Oral presentation)

Published book:

1. F. Azimifar, **S. Rismani Yazdi** “*Finite element modeling of machining and forming processes using DEFORM-3D*” Nashre Dastkhat, Isfahan, Iran, 2011. (Language: Farsi)

INVITED PRESENTATION

- As part of Collaborative Research and Training Experience (CREATE) program in Chemistry Department at Queen’s University, I was invited to present my research on hanging drop microfluidics for body-on-a-chip applications to graduate students (2016). Course instructor: Prof. Sabeth Verpoorte, University of Groningen, The Netherlands.

RESEARCH EXPERIENCE

- **PhD project**, Queen's University, Canada, 2015-2018

My research is focused on development of microfluidic platforms to study the behavior of bacteria and their interactions with surrounding environments at microscale for i) magnetotactic bacteria, ii) ice-binding bacteria, iii) oil-degrading bacteria, and iv) E coli. Designed and managed multiple multidisciplinary research projects efficiently and effectively. Designed, fabricated, and characterized novel microfluidic devices for bacteria behavior studies. Developed innovative and robust microdevices to form observable and controllable oil-water and ice-water interfaces. Observed and quantified swimming behaviour of bacteria in complex flow and porous environments. Performed cell culture, live-cell imaging, TEM/SEM imaging, fluorescence and confocal imaging. Wrote research articles and supervised undergraduate and graduate students.

- **Master degree project**, BEL, D-BSSE, ETH Zurich, Switzerland, 2014-2015

In my master thesis, I introduced a compact on-chip pumping approach for flow control in hanging drop networks. Design, fabrication, and characterization of a novel micropump integrated in completely open microfluidic system, able to generate wide ranges of unidirectional pulsatile and continuous flow profiles were presented. With the proposed concept, several independent hanging drop networks were operated in parallel with only one single pneumatic actuation line at high fidelity. Closed-loop medium circulation between different organ models for multi-tissue formats and multiple and simultaneous assays in parallel were possible. Further, numerical simulation of fluid dynamics of hanging drop networks with integrated pumps for predicting systems' behavior under various external conditions were performed. Finally, I implemented a real-time feedback control loop of the pump actuation based on the beating of a human iPS-derived cardiac microtissue cultured in the same system. This configuration provided the opportunity to simulate the function and characteristic behavior of a heart, which constitutes a further step towards microphysiological, or so-called "body-on-a-chip" systems.

- **Summer project**, Dept. of Biosystems and Micromechanics, SMART center, NUS, Singapore, 2013

During my internship at BioSyM, I was responsible to design and perform experiments for 2D and 3D assays in well plates and microfluidic devices with MDA-MB-231 breast cancer cell, defining type, concentration, and volume of required reagents, culturing cells, seeding with and without collagen gel, staining (actin, myosin, filamin, and vinculin), imaging and post processing, troubleshooting, optimization of the process parameters. In addition, I learnt about other research projects such as angiogenesis, hypoxia, isolation of circulating tumor cells (CTCs) and enrichment of malaria parasite using microfluidic techniques.

- **Bachelor degree internship**, Sepanta Mechatronic Engineering Co., Isfahan, Iran, 2011

Designed and simulated components of educational robots, and robotic systems.

- **Summer internship**, Tamkar Co., Isfahan, Iran, 2010

Designed sheet metal components for cement production line.

TEACHING EXPERIENCE

- **Teaching assistant**, Dept. of Chemical Engineering, Queen's University, Canada, 2016-2018

- CHEE 218: Laboratory Projects I, Instructor: Dr. D. Poirier, 2017-2018
- CHEE 452: Transport Phenomena in Physiological Systems, Instructor: Prof. B. Amsden, 2016-2017
- CHEE 210: Thermodynamic Properties of Fluids, Instructor: Prof. B. Amsden, 2016

- **Teaching assistant**, Dept. of Mechanical Engineering, Azad University of Najafabad, Iran, 2009-2011
 - CAD/CAM/CAE, Instructor: Prof. S. Mirian, 2009-2010
 - Gig and Fixture Design, Instructor: Prof. E. Imanian, 2010-2011
- **Instructor**, Azad University of Najafabad, Engineering Institute, Isfahan, Iran, 2012
 - Taught mechanical engineering CAD software: CATIA and Autodesk Inventor
 - Taught principles and designing methods of industrial jigs and fixtures

STUDENT SUPERVISORY EXPERIENCE

Have designed experiments and supervised 3 undergraduate and 2 graduate students for their thesis projects:

- **Erick Morales**, M.Sc. student, Dept. of Electrical Engineering, UNAM, Mexico, 2017
- **Kristian Kraemer**, B.Sc. student, Dept. of Chemical Engineering, Queen's University, Canada, 2017
- **David Vogel**, M.Sc. student, Swiss Nanoscience Institute, University of Basel, Switzerland, 2016
- **Sebastien Goodchild**, B.Sc. student, Dept. of Chemical Engineering, Queen's University, Canada, 2016
- **King Qing Nicholas**, B.Sc. student, BioSystems Research Group, National University of Singapore, 2013

TECHNIQUES

- | | |
|--|---|
| ▪ Microfluidic chip design and microfabrication | ▪ Fluid mechanics and thermodynamics |
| ▪ Photolithography (mask aligner and maskless system) in cleanroom | ▪ CAD/CAM/CAE and FEM |
| ▪ Multilayer soft lithography | ▪ Tensile, impact, creep, and fatigue tests |
| ▪ 3D printing | ▪ Milling, turning, drilling, EDM, and measurement devices, hydraulic and pneumatic systems |
| ▪ Bacteria/Mammalian cell/microtissue culture | ▪ Casting, welding, sheet metal, and heat treatments |
| ▪ Biochemical assays | ▪ SIEMENS S7 programming (automation) |
| ▪ Immunofluorescence staining | ▪ Sensors and actuators |
| ▪ Fluorescence microscopy | |
| ▪ Image analysis | |
| ▪ Numerical simulation | |

COMPUTER SKILLS

- | | | | |
|---------------------|-------------|---------------------|--------------------|
| ▪ CATIA | ▪ DEFORM-3D | ▪ Imaris | ▪ Adobe Photoshop |
| ▪ Autodesk Inventor | ▪ ABAQUS | ▪ Fiji | ▪ Microsoft Office |
| ▪ AutoCAD | ▪ MATLAB | ▪ CleWin | |
| ▪ Solidworks | ▪ LabVIEW | ▪ Origin | |
| ▪ Mastercam | ▪ Minitab | ▪ Adobe Illustrator | |

REFERENCES

References available upon request.

Journal front covers:

