

# Sanaz Arabzadeh Esfarjani

SENIOR SOFTWARE ENGINEER

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## Summary

Proven software engineer and project lead with experience in designing and developing production software used by many leading engineering companies. A quick learner enthusiastic to learn new technologies and take on diverse challenges.

## Skills

**Programming** Python, MATLAB, Simulink, Simscape, C, Javascript, Node.JS, SQL  
**Web** Django with Python, Express with Node.JS, jQuery, HTML5, Bootstrap  
**Tools** MongoDB, Git, Agile

## Experience

### The MathWorks, Inc.

*Natick, Massachusetts*

SENIOR SOFTWARE ENGINEER

*Nov. 2013 - Present*

- Designed, implemented, tested, and documented initial version of the Simscape Fluids 1.0 fluid modelling library for Simscape. This library is used by many leading engineering companies in their design workflows.
- Led project to convert many hydraulic components to new isothermal library, leading to 40% improved performance and much improved accuracy.
- Presented technical details of libraries and features at industry conference before hundreds of attendees.
- Worked with external business industry contacts to include new functionalities including the built-in fluids properties in Simscape Fluids libraries.

### PerkinElmer Health Sciences Canada, Inc.

*Woodbridge, Ontario, Canada*

RESEARCH ASSOCIATE

*Jun. 2012 - May. 2013*

- Developed a computational model of magneto-hydrodynamics (MHD) and particle transport in mass spectrometry technology to identify the main factors in design optimization. Worked directly with the chief technology scientist and the director of R&D.
- Work led to an innovative experimental initiative to develop the next-generation of spray injectors to increase the evaporation efficiency of aerosols in mass spectrometry instruments.
- Prepared technical reports and presented the results in American Association for Aerosol Research (AAAR) conference and European Winter Conference on Plasma Spectrochemistry (EWCPs).

### Centre for Advancing Coating and Technology (CACT), University of Toronto

*Toronto, Ontario, Canada*

RESEARCH ASSISTANT

*Jan. 2006 - April. 2013*

- Created a computational platform for design and optimization of the process of carbon nanotube production by radio frequency inductively coupled plasma (RF-ICP) technology.
- Identified the limiting factors in the yield rate of carbon nanotubes in RF-ICP technology and developed a computational model to analyze the fluid flow and heat transfer in the system's initial re-design development.
- Conducted design validations of a chemical kinetic model for predicting the chemistry of generated nanoparticles and nanomaterial in the RF-ICP system through optimized parallel-computing implementations in an in-house CFD software.

## Courses & Projects

### The Web Developer Bootcamp

UDEMY ONLINE COURSE

2019

- **Tools & technologies:** Javascript, jQuery, HTML5, CSS3, Bootstrap 4, Node.js, ExpressJS, MongoDB, REST, Authentication.
- **Project:** Patatap Clone – Game where each keyboard key plays a sound and animation, created with jQuery, Paper.js & Howler.js.
- **Project:** TODO list – TODO list app created using jQuery and Bootstrap.
- **Project:** Color Game App – RGB color guessing game built using Javascript, HTML5, and CSS.
- **Project:** Movie API – JSON API to return information about movies.
- **Project:** YelpCamp – Campground review site with user authentication and web interface built with MongoDB and REST API backend and Bootstrap frontend.

### Machine Learning

COURSERA ONLINE COURSE

2017

- **Topics:** Linear regression, logistic regression, regularization, neural networks, SVM, unsupervised learning, dimensionality reduction, anomaly detection, recommender systems.

### Introduction to Data Science in Python

COURSERA ONLINE COURSE

2017

- **Topics:** Series, DataFrames, Pandas, Numpy, hypothesis tests.

## Education

### University of Toronto

PH.D. IN MECHANICAL ENGINEERING

- Dissertation topic: A Numerical Platform for the Synthesis of Carbon Nanotubes by RF Plasma Technology, GPA: 4/4

Toronto, Ontario, Canada

Apr. 2013

### Concordia University

M.Sc. IN MECHANICAL ENGINEERING

- Thesis topic: Numerical Simulation of Two-phase Flow in an Effervescent Atomizer for Nano- suspension Spray, GPA: 4.15/4.3

Montreal, Quebec, Canada

Dec. 2007

### Sharif University of Technology

B.Sc. IN MECHANICAL ENGINEERING

- Thesis topic: Analytical Models of Energy Consumption in Residential Buildings in Iran, GPA: 16.46/20

Tehran, Iran

Jul. 2004

## Honors & Awards

2009-2013 , Ontario Graduate Scholarship (OGS)

Toronto, Canada

2012 , The American Association for Aerosol Research (AAAR) Student Travel Grant

Toronto, Canada

2008-2011 , University of Toronto Open Fellowship

Toronto, Canada

2011 , School of Graduate Studies (SGS) Conference Grant, University of Toronto

Toronto, Canada

2011 , The MIE Graduate Student Travel Grant, University of Toronto

Toronto, Canada

2005-2007 , Concordia University International Tuition Fee Remission Award

Montreal, Canada

2007 , Nominee for best M.Sc. thesis at Concordia University, Montreal

Montreal, Canada

## Invited Talks

### Canadian Society of Iranian Engineers and Architects (Mohandes)

Toronto, Canada

INVITED SPEAKER

Nov. 2011

- Presented new advances in modeling Single-Walled Carbon Nanotubes.

### 9th GMSICOSM-UT2 Graduate students workshop

Tokyo, Japan

PRESENTER FOR CACT LABS

Jun. 2010

- Presented the recent work on numerical modeling of metal nanoparticles and single-walled carbon nanotubes in induction thermal plasma spray.

## Publications

### Book Chapters

- S. Arabzadeh Esfarjani, Numerical Simulation of Two-phase Flow in an Effervescent Atomizer, VDM Verlag Dr. Mller Publication.
- S. Arabzadeh Esfarjani, Heating and Cooling load calculations Chapters, Applied Energy Saving Handbook, T. Fatanat Didar (ed), Sharif University publications, Tehran (2006). (The first practical handbook on energy saving in Iran).

### Peer-Reviewed Publications

- S. Arabzadeh Esfarjani, S. B. Dworkin, J. Mostaghimi, K. S. Kim, C. T. Kingston, B. Simard, and G. Soucy, "Detailed Numerical Simulation of Single-Walled Carbon Nanotube Synthesis in a Radio-Frequency Induction Thermal Plasma System", Journal of Physics Conference Series, 406 (2012) 012011.
- S. Arabzadeh Esfarjani, J. Mostaghimi, K. Kim, A. Shahverdi, and G. Soucy, "Radio Frequency Thermal Plasma: The Cutting Edge Technology in Production of Single-Walled Carbon Nanotubes", Journal of Thermal Science and Technology, 6 (2011) 307-322.
- S. Arabzadeh Esfarjani, and A. Dolatabadi, "A 3D Simulation of Two-phase Flow in an Effervescent Atomizer for Suspension Plasma spray", Surface and Coatings Technology, 203 (2008) 2074-2080.
- S. Arabzadeh Esfarjani, and A. Dolatabadi, "Numerical Simulation of Nano-Particle Suspension in an Effervescent Atomizer", Journal of Computational and Theoretical Nanoscience, 5(2008) 1-8.

### Conference Proceedings and Presentations

- "A Piezoelectrically Actuated Nebulizer for Inductively Coupled Plasma Mass Spectrometry (ICP-MS)", S. Arabzadeh Esfarjani, H. R. Badiei, K. Kahan, and J. Mostaghimi, 31st American Association for Aerosol Research (AAAR) Annual Conference, Minnesota, USA, 8-12 October 2012.
- "Detailed Numerical Simulation of Single-Walled Carbon Nanotube Synthesis in a Radio-Frequency Induction Thermal Plasma System", S. Arabzadeh Esfarjani, S. B. Dworkin, J. Mostaghimi, K. S. Kim, C. T. Kingston, B. Simard, and G. Soucy, 12th High-Tech Plasma Processes Conference (HTPP-12), Bologna, Italy, 24-29 June 2012.
- "Parametric Study of Thermo-Flow Fields in an Inductively Coupled RF Plasma Processing System for the Production of Single-Walled Carbon Nanotubes", S. Arabzadeh Esfarjani, J. Mostaghimi, A. Shahverdi, G. Soucy, K. S. Kim, and B. Simard, 20th International Symposium on Plasma Chemistry (ISPC20), Philadelphia, USA, 24-29 July 2011.
- "CFD Simulation of Single-walled Carbon Nanotube Growth in an RF Induction Thermal Plasma Process with Chemistry Model", S. Arabzadeh Esfarjani, S. B. Dworkin, J. Mostaghimi, K. S. Kim, B. Simard, and G. Soucy, 42nd AIAA Plasma dynamics and Lasers Conference in conjunction with the 18th International Conference on MHD Energy Conversion (ICMHD), Honolulu, Hawaii, USA, 27 - 30 Jun 2011.
- "Simulation of Single-walled CNT Growth in an RF Induction Thermal Plasma Process with a Detailed Chemistry-Particulate Model", S. Arabzadeh Esfarjani, S. B. Dworkin, and J. Mostaghimi, SIMS-NRC strategic meeting, Ottawa, Ontario, Canada, 6 December 2010.