MOJTABA BARZEGARI

Leuven, Belgium

(+32) 16 193831

mojtaba.barzegari@kuleuven.be

mbarzegary@msn.com

in ☺ f ☺ mbarzegary

ℰ mbarzegary.github.io

Last Update: March 3, 2020

Education

Ph.D. Researcher — 2018 – 2020
Biomechanics Section, KU Leuven — Leuven, Belgium

- **Field:** Computational Tissue Engineering
- **Project Title:** Computational Multiscale Modeling of Biodegradation Behavior of Personalized Printed Implants
- **Supervisor:** Prof. Liesbet Geris

Master of Science in Biomedical Engineering — 2011 – 2014
Department of Life Science Engineering, University of Tehran — Tehran, Iran

- **Major:** Biomaterials
- **Thesis:** Computational and Experimental Analysis of Dynamics of Urine Flow in the Lower Urinary System in the Physiological and Pathological Conditions using FSI Method
- **Supervisor:** Prof. Bahman Vahidi

Bachelor of Science in Materials Science and Engineering — 2006 – 2011
Department of Materials Engineering, Amirkabir University — Tehran, Iran

- **Major:** Industrial Metallurgy
- **Thesis:** Prediction of Microshrinkage Porosities using the Permeability Parameter Modeled with Artificial Neural Networks in Al-6%Si Alloy by Finite Volume Method
- **Supervisor:** Prof. S.M.H. Mirbagheri

Research Interests

- Scientific Computing
- Computational Engineering
- GPU programming and High-Performance Computing
- Machine Learning and Computational Intelligence
- Computational Biomechanics
- Computational Materials Science

Research Projects

Computational Bioengineering

- Mathematical modeling and numerical simulation of biodegradation behavior of metallic implants and medical devices, *KU Leuven*   2018–2020

- Mathematical modeling and numerical simulation of bone tissue growth process, *KU Leuven*   2019–2020

- Numerical modeling of oxygen consumption and cell viability for pancreatic islets, *KU Leuven*   2019–2020

Computational Fluid Dynamics

- Numerical modeling of foam formation process using Lattice Boltzmann method and multiphase fluid simulation, *Amirkabir University of Technology*   2013–2017

- Development of coupling simulation software packages to link multiphysics CFD models and AI, *Amirkabir University of Technology*   2010–2011

- Development of in-house CFD codes for simulating fluid flow and heat transfer in metal casting process, *Amirkabir University of Technology*   2008–2011

Computational Biomechanics

- Implementation of Fluid-Structure Interactions models to simulate fluid dynamics of human body fluids, *University of Tehran*   2012–2014

Computational Materials Science

- Development of dendrite and microstructure growth models to simulate the solidification process of metals, *Amirkabir University of Technology*   2009–2011

- Development of heat transfer simulation codes in order to model heat treatment in metals, *Amirkabir University of Technology*   2008

Machine Learning and Computational Intelligence

- Implementation of Machine Learning models for signal processing and anomaly detection of EEG and ECG signals, *KU Leuven & Imec*   2018–2019

- Implementation of ANN models to investigate complex parameters of urology diseases, *University of Tehran*   2013–2014

- Implementation of ANN models to investigate relations between porous media parameters and permeability, *Amirkabir University of Technology*   2010–2011

Publications

Publications in refereed journals

1. B. Farahani, **M. Barzegari**, F. Shams Aliee, K. A. Shaik, "Towards collaborative intelligent IoT eHealth: From device to fog, and cloud", Microprocessors and Microsystems, vol. 72, p. 102938, 2020

2. **M. Barzegari**, H. Bayani, S. M. H. Mirbagheri, and H. Shetabivash, "Multiphase aluminum A356 foam formation process simulation using lattice Boltzmann method", Journal of Materials Research and Technology, vol. 8, no. 1, pp. 1258–1266, Jan. 2019

3. H. Bayani, S. M. H. Mirbagheri, **M. Barzegari**, and S. Firoozi, "Simulation of Unconstrained Solidification of A356 Aluminium Alloy on Distribution of Micro/Macro Shrinkage", *Journal of Materials Research and Technology*, vol. 3, no. 1, pp. 55-70, 2014

Publications as Book Chapters

1. F. Firouzi, B. Farahani, F. Ye, **M. Barzegari**, "Machine Learning for IoT", in Intelligent Internet of Things, Springer International Publishing, pp. 243–313, 2020

2. S. M. H. Mirbagheri, H. Bayani, **M. Barzegari**, S. Firoozi, "Simulation of Liquid Flow Permeability for Dendritic Structures during Solidification Process", *Computational Fluid Dynamics Technologies and Applications*, Intec, 2011

Preprints and Submitted Papers

1. **M. Barzegari**, H. Bayani, S. M. H. Mirbagheri, "A Criterion for Bubble Merging in Liquid Metal: Computational and Experimental Study", arXiv Preprint

2. **M. Barzegari**, B. Vahidi, M. R. Safarinejad, "A Clinical and Finite Elements Study of Stress Urinary Incontinence in Women Using Fluid-Structure Interactions", arXiv Preprint

3. **M. Barzegari**, B. Vahidi, M. R. Safarinejad, M. Hashemipour "Pathological Analysis of Stress Urinary Incontinence in Females using Artificial Neural Networks", arXiv Preprint

Publications in refereed conference proceedings

1. B. Farahani, **M. Barzegari**, F. Shams Aliee, "Towards Collaborative Machine Learning Driven Healthcare Internet of Things", *Proceedings of the International Conference on Omni-Layer Intelligent Systems*, Crete, Greece, 2019

Conference and symposium abstracts

1. (Oral presentation) **M. Barzegari**, L. Geris, (2019). "High-performance numerical simulation of biodegradation process with moving boundaries". FreeFEM Days, 11th Edition, Paris, France, Dec 2019

2. (Oral presentation) **M. Barzegari**, L. Geris, (2019). "Computational Modeling Of Biodegradation Of Metallic Biomaterials". 18th National Day on Biomedical Engineering, Brussels, Belgium, Nov 2019

3. (Poster presentation) **M. Barzegari**, L. Geris, (2019). "Developing a mathematical model of biodegradable metallic scaffolds for bone tissue engineering applications". 7th Belgian Symposium on Tissue Engineering, Hasselt, Belgium, Nov 2019

4. (Oral presentation) **M. Barzegari**, F.P. Boerema, L. Geris, (2019). "Computational optimization and biodegradation of 3D-printed patient-specific acetabular implants". European Orthopaedic Research Society (EORS) 2019, Maastricht, the Netherlands, Oct 2019

5. (Oral presentation) **M. Barzegari**, L. Geris, (2019). "High-performance simulation of biodegradation behavior of magnesium-based biomaterials". Fluid and solid mechanics for tissue engineering, Oxford, UK, Sep 2019

6. (Oral presentation) **M. Barzegari**, L. Geris, (2019). "Numerical simulation of biodegradation and corrosion of magnesiumbased orthopedic implants". 2nd International Conference on Simulation for Additive Manufacturing, Pavia, Italy, Sep 2019

7. (Oral presentation) **M. Barzegari**, L. Geris, (2019). "Mathematical modeling of biodegradation of metal implants in orthopedics". 11th Symposium on Biodegradable Metals, Alicante, Spain, Aug 2019

Publications in non-English (Persian) journals and proceedings

1. **M. Barzegari**, B. Vahidi, M. R. Safarinejad, "Investigating Stress Urinary Incontinence in Women Using Computational Methods and Clinical Data", *Journal of Modares Mechanical Engineering*, vol. 17, no. 5, pp. 417-427, 2017

2. **M. Barzegari**, B. Vahidi, M. R. Safarinejad, "Computational Simulation of Stress Urinary Incontinence using Fluid-Structure Interaction Analysis", *25th International Conference on Mechanical Engineering*, Tehran, Iran, 2017

3. **M. Barzegari**, H. Bayani, S. M. H. Mirbagheri, "Computational and Experimental Investigation of Air Bubbles Coalescence in Metal Melts", *25th International Conference on Mechanical Engineering*, Tehran, Iran, 2017

4. S. Gholami, A. Danayi, A. Rezaee, **M. Barzegari**, "Embedded Systems and the Challenge of Complex Computing in Internet of Things", *1st International Conference on Internet of Things, Applications and Infrastructure*, Isfahan, Iran, 2017

5. S. M. H. Mirbagheri, H. Bayani, **M. Barzegari**, "Micro Shrinkages Simulation in Mushy Zone by Permeability Calculation", *Journal of Iranian Foundrymen's Society*, vol. 102, pp. 42-50, 2013

6. **M. Barzegari**, S. M. H. Mirbagheri, "Assessment of the Slope and Cross-Section of In-Gate on the Pressure and Flow Pattern Using Finite Volume Method", *Journal of Metallurgical and Materials Engineering*, vol. 22, no. 2, pp. 21-36, 2011

Work Experiences

Selected projects (among 20 more) in 15 years of professional software development and computer programming experiences (2003–2017):

Internet of Things & Embedded Systems

- Design and implementation of smart home solutions based on IoT and Cloud Computing paradigms, Freelance projects   2016–2017

- Design and implementation of embedded systems and embedded Linux programs using C, C++, Python and GNU toolchains, Amirkabir University of Technology   2016–2017

Web & Mobile Applications

- Implementation of resources and documents management software for Iran Red Crescent Society using C# and .NET web technologies   2015–2016

- Implementation of online shopping system for Parhoon Koosha Co. using PHP   2016

- Implementation of Android-based enterprise apps using Java and Xamarin technologies, Freelance projects   2015–2016

- Development and optimization of the UI of comprehensive medical instruments software developed in C#, Avizheh IT Co.   2014

- Development of commission management software for Tehran Municipality using C# and .NET web technologies   2011

Desktop & Enterprise Applications

- Development of estate profiling software using C#, Venus IT Co.   2013

- Development of Tehran districts profiling and reporting software for Tehran Municipality using C# and .NET technologies   2012

- Development of office and workflow automation software for Iran Tube and Machine Manufacturing Corporation using C# and .NET technologies, Avizheh IT Co.   2010–2011

- Development of project control and operational automation software for Iran Railway Corporation using VB and .NET technologies, Avizheh IT Co.   2008–2011.

- Development of workflow management software for Parhoon Koosha Co. using C# and .NET technologies   2006

Scientific Applications

- Implementation of SUTCast simulation software code in MATLAB (fluid flow and heat transfer modules), Razi Research Center of Applied Science   2015
- Implementation of ANN models for optimization of rolling parameters in Mobarakeh Steel Manufacturing Co. using MATLAB   2014
- Development of mathematical computation and function plotting software using C# (Awarded as the 2nd place in Khwarizmi young award of scientific innovation)   2004
- Development of robot control software using VB, Iran Students' Foundation   2003

Teaching and Supervision Experiences

Supervision

- Daily supervisory of 15 students (mechanical engineering) for the "Problem Solving and Design" course on "Improving a pre-cleaner design" project, KU Leuven   2019–2020

Unofficial Teaching

- Teaching metal casting simulation to mechanical engineering students
- Teaching scientific computing concepts to biomedical engineering students
- Teaching advanced programming to electrical engineering students
- Teaching computer basics and mathematics to kids

Workshops

- "Towards Embedded Systems, Motivational Role of Free Software", Tehran Software Freedom Day Festival, Sharif University of Technology   2016
- "An introduction to LaTeX for thesis typesetting", University of Tehran   2013

Awards

- Best short oral and poster presentation prize in the corrosion topic, Biometal symposium   2019
- Best hands-on project prize on "Machine learning and mechanistic tissue modeling for image-guided brain surgery", VPH Summer School   2019
- Awarded researcher of the Department of Materials Science and Engineering, Amirkabir University of Technology   2011
- 2nd Place in Khwarizmi young award of scientific innovation in the field of mathematics (project title: mathematical computation and function plotting software)   2004

Technical Skills

- **Operating Systems**
  Microsoft Windows (Client & Server), GNU/Linux (Desktop & Embedded)
- **Programming Languages & Frameworks**
  C, C++, C#, Python, Java, Visual Basic, T-SQL, ActionScript, .NET and .NET Core, Android app development, Xamarin, Universal Windows Platform (UWP), Arduino
- **Scientific Computing**
  MATLAB & GNU Octave, Maple, CUDA, FreeFEM

- **Databases**
  Microsoft SQL Server, MySQL (MariaDB)

- **Web Development**
  HTML, CSS, JavaScript, PHP, ASP.NET, Django

- **Engineering Software Packages**
  SolidWorks, ANSYS (Mechanical, Fluent, Explicit Dynamics & AUTODYN), ProCAST, MSC Patran, MD ADAMS, COMSOL

- **Other**
  LaTeX, Docker, Git

Personal Details

- **Date of Birth:** February 25th, 1988

- **Nationality:** Iranian

- **Languages Known:**

  - Persian: Native
  - English: Fluent

- **Extracurricular Activities:**

  - Amateur guitar playing (bass, acoustic, electric)
  - Playing volleyball & chess
  - Swimming & biking
  - Playing computer & mobile games
  - Reading science, music, and history books