

Mahsa Ghaffari

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Summary Highly-motivated PhD candidate in Biomedical engineering expert in biomechanics, computer programming, simulation, CAD design and optimization. A quick learner and team player with good leadership; project management and professional communication skills.

Education **Doctorate of Philosophy (PhD)**, Bioengineering (2013-2016)
University of Illinois at Chicago (UIC), GPA: 4.00/4.00
Master of Science (MS), Biomedical Engineering-Biomechanics (2010-2012)
University of Tehran Polytechnics. Tehran, IR, GPA: 4.00/4.00
Bachelor of Science (BS), Biomedical Engineering-Biomechanics (2006-2010)
Science and Research University (Azad University), Tehran, IR, GPA: 16.26/20.00

Work/Research Experience **Research Assistant**, UIC. Laboratory of Product and Process Design, (07/2013-Present)
Project: Patient-specific hemodynamic simulation and surgical planning for cerebrovascular disease.

- Computational modeling of brain vascular mechanics.
 - Software development for automatic parametric mesh generation.
 - Image processing and extraction of vascular from MRI.
 - Fluid dynamic simulation.
 - Model validation using extracted volumetric blood flow using pc-MRI.
 - Data fitting using Bezier curve approximation techniques.
 - Trained and supervised two laboratory technicians.
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Program Manager, Bioengineering department, UIC (01/2015-Present)

NSF-RET (National Science Foundation- Research Experience for Teachers),

- **Project:** Management and implementation of a summer program for introducing high-school teachers to university-level research in order to increase knowledge of engineering and technological innovation
 - Nine event organization for the purpose of
 - Laboratory research training
 - Research evaluation progress
 - Assessing the outcome of the research project performed by the teachers.
 - Handling the advertisement of the program, application process and other administrative processes involved in recruitment of the teachers.
 - Interacted with faculty and members of various laboratories at UIC and Rush University to include the teachers in their labs based on their experience.
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Internship, Design Engineer, Gamma consulting engineering company (06/2010-09/2010)

Project: Consultant design and management for commercial and residential project.

- Generating permitting services for residential and commercial projects
 - Comprehensive database management
 - Team-work organizer, financial reporting, prototype generation
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Research Assistant, Motion Analysis Laboratory; Tehran Polytechnic (06/2010-06/2012)

Project: Finite element modeling of Traumatic Brain Injury under blunt Impact.

- Motion analysis for dummy car test.
 - Using Finite Element Methods (FEM) to simulate traumatic brain injury for human.
 - Work on clinical and industrial applications of my 3D FEM human head model
 - Scalp cooling modeling
 - Helmet design optimization, analysis of a helmet with different pad thickness
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Internship, Maintenance technician, Mehrad Hospital, Tehran, IR. (05/2009-09/2009)

Project: Maintenance and calibration of medical devices

- Trained in medical equipment maintenance program
- Report writing and Guarantee check for medical
- Accuracy testing and calibration, battery testing

- Anesthesia unit test, ECG, centrifuge and mobile X-ray system

Research Assistant, Robotic Surgery Laboratory; Research Center for Science and Technology in Medicine, Tehran, IR. (10/2009-06/2010)

Project: Optimization of cup orientation in hip replacement to prevent hip dislocation.

- Involved in design and build of apparatus
- Finite element analysis of acetabular cup
- Optimization of hip location to minimize impingement-dislocation risk
- This research project led to the publication of a scientific article

Teaching Experience

Teacher Assistant, Biomechanics, UIC.

Syllabus: Biomechanics, Robotics, Finite element analysis, Solid Mechanics, Fourier Analysis.

Teacher Assistant, Biological system analysis, UIC.

Syllabus: Linear Algebra, Optimization Methods, System Dynamics, Linear and Non-Linear ODE Laplace Transform, Polynomial Approximations

Specialized skills

- Exceptional precision in designing and conducting scientific experiments
- Technical expertise in numerous engineering and computer programs such as:
 - *Programming:* C++, Pascal, MATLAB, Delphi.
 - *Finite Element Analysis:* ANSYS, Fluent, Gambit, ABAQUS, ADINA,
 - *Mechanical Design:* Solidworks, AutoCAD
 - *Image processing:* Mimics, VMTK.
 - *Others:* Photoshop, Microsoft Office (Word, Excel, Power-point),
- Remarkable teaching and training skills, self-motivated, organized, professional communicating skills

Publications

- Chih-Yang Hsu, Ben Schneller, **Mahsa Ghaffari**, Ali Alaraj, Andreas Linninger, "Medical Image Processing for Fully Integrated Subject Specific Whole Brain Mesh Generation", *Technologies* 3 (2), 126-141, 2015.
 - Mohammad Sheikholeslami, **Mahsa Ghaffari**, Ahmadreza Khorasani, Mohammad Zoghi "Site-Dependence Scalp Cooling System to Prevent Hair Loss during Chemotherapy", *Journal of Bioengineering & Biomedical Science* 5 (2), 2015.
 - **Mahsa Ghaffari**, Chih-Yang Hsu, Ali Alaraj, Andreas Linninger. "Hemodynamic simulation of the patient specific cerebral blood flow towards a personalized surgical planning for vascular disorders". *XXVIIth International Symposium of Cerebral Blood Flow, Metabolism and Function, XIIIth International Conference on Quantification of Brain Function with PET*, June 27th-30th 2015, Vancouver, Canada
 - **Mahsa Ghaffari**, Chih-Yang Hsu, Ben Schneller, Xiaohong Joe Zhou, Ali Alaraj, Andreas A. Linninger "Automatic and patient-specific reconstruction of the cerebral vasculature, CSF spaces and parenchyma for hemodynamic assessment of vascular pathologies", accepted in *European Stroke Conference*, Vienna, 2015.
 - **Mahsa Ghaffari**, Chih-Yang Hsu, Andreas Linninger, "Automatic reconstruction and generation of structured hexahedral mesh for non-planar bifurcations in vascular network" 12th International Symposium on Process Systems Engineering and 25th European Symposium on Computer Aided Process Engineering, published in *Computer Aided Chemical Engineering book series*, volume 37, 2015.
 - **Mahsa Ghaffari**, Mohamad Zoghi, Mostafa Rostami, Nabiollah Abolfathi, "Fluid Structure Interaction of Traumatic Brain Injury: Effect of Material Properties on SAS Trabeculae", *Journal of Modern Engineering*, spring 2014.
 - **Mahsa Ghaffari**, Kourosh Bajelani, Mostafa Rostami, Nabiollah Abolfathi, "Three dimensional Human Head Model for The Study of Traumatic Brain Injury", *IEEE 19th International*
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Conference of Biomedical Engineering, ICBME, Iran, Tehran, 2012.

- **Mahsa Ghaffari**, Mohamad Zoghi, Mostafa Rostami, Nabiollah Abolfathi, "A New Approach to Model Subarachnoid Trabeculae Resistance in Cerebrospinal Fluid Flow", *IEEE 19th International conference of Biomedical Engineering, ICBME, Iran, Tehran, 2012.*
- **Mahsa Ghaffari**, Reza Nickmanesh, Neda Tamannaee, Farzam Farahmand, "The Impingement-Dislocation Risk of Total Hip Replacement: Effect of Cup Orientation and Patient Maneuvers", *IEEE EMBS 34th International Conference of the IEEE Engineering in Medicine & Biology Science, USA, San Diego, 2012.*
- **Mahsa Ghaffari**, Mohamad Zoghi, Mostafa Rostami, Nabiollah Abolfathi, "Finite Element Modeling of Traumatic Brain Injury to Study the Role of Subarachnoid Trabeculae", *International Crashworthiness Conference, ICRASH, Milan, Italy, 2012.*

**Honors and
Rewards**

Best Master research award. Tehran Polytechnics (2013)

Having a live interview by national television of Iran. (2013)

Tuition waiver award. Tehran Polytechnics (2010-2012)

Undergraduate Research Award, Azad University, (2009)

Member of Iranian Society of Biomedical Engineers (ICBME)