Seyed Ali Elahi

BioMMat team (Biomedical and Mechanical engineering of Materials)
CAMI team (Computer Assisted Medical Interventions)
University of Grenoble Alpes, Grenoble, France
Grenoble Institute of Technology, Grenoble, France
email: elahiseyyedali@gmail.com; seyed-ali.elahi@univ-grenoble-alpes.fr

Education

2015-2018 **PhD**, Mechanical Engineering, University of Grenoble Alpes, TIMC-IMAG Laboratory, France.

Thesis Title: In-vivo and In-situ mechanical characterization of soft living tissues

An original aspiration method for characterization of soft living tissues is introduced and experimentally validated using silicone materials. An updated FE simulation is used for inverse characterization of the tissues. The method is proved to be able to identify the two-layer soft tissues' mechanical properties. Parameter sensitivity of the FE analysis is assessed and a real-time inverse identification is enabled. The method will be used for characterization of different layers of human skin as the first organ that will be studied.

Supervisors: Yohan Payan and Nathanael Connesson

Funded by: France Ministry of Science, Grenoble Institue of Technology

2014-2015 **PhD (Unfinished)**, Mechanical Engineering (Applied Design), University of Tehran, Iran.

2012-2014 **MSc**, Mechanical Engineering (Applied Design), Shiraz University of Technology, Iran.

Thesis Title: Theoretical and experimental study of deformation and energy absorption by metal and composite tubes with different cross-sections and fillers under lateral loading

Different fiber fabric composite tubular sections are fabricated and their crash worthiness under lateral flattening is evaluated experimentally in empty and polyurethane foam-filled conditions. Some new theoretical relations are introduced in order to prediction of energy absorption of empty and filled composite tubes. In addition, effects of creation of different notches and adding the rubber filler on energy absorption of metallic and composite tubular sections are investigated. Samples for experimental studies have been prepared with cooperation of Farapox Shiraz and Iran Industrial Vibration Companies.

Supervisors: Hassan Assaee and Jafar Rouzegar, *Advisor:* Abbas Niknejad

GPA = 18.60 on a scale of 0 to 20.

2008-2012 **BSc**, Mechanical Engineering (Design of Solids), Yasouj University, Iran.

Final Project title: Theoretical and experimental investigation of flattening of empty and polyurethane foam-filled tubes

Energy absorption behavior of empty and polyurethane foam-filled metallic tubular sections under lateral flattening is studied experimentally and theoretically.

Supervisor: Abbas Niknejad

GPA = 17.23 on a scale of 0 to 20.

Research Interests

Experimental Mechanics, Biomechanics, Mechanical characterization of materials, Soft tissues characterization, Finite Element Analysis, Inverse characterization methods, Viscoelasticity, Hyperelasticity, Silicones, Composite materials, Large deformation, Fracture Mechanics, Energy absorbers, Metal forming, Polyurethane foams

Professional Experience

Dec Feb	2013- 2014	Designer, Rost Furniture Company, Shiraz, Iran
Mar Sep	2010- 2012	Part-time teacher of CATIA engineering package, Novin Robotic Society of Shiraz, Shiraz, Iran
Jun Sep	2010- 2010	Internship in Iranian Offshore Oil Company, Lavan Island, Iran
Sep Feb	2009- 2010	Teacher assistant of Robotic Course, University of Yasouj, Yasouj, Iran
Sep Sep	2008- 2009	Part-time teacher of Robotic, Novin Robotic Society of Shiraz, Shiraz, Iran

Computer Skills

MATLAB, Ansys, Abaqus, CATIA, AutoCAD, Working Model, LaTeX, Microsoft Office, familiar with Python and C++

Experimental Skills

- Material characterization tests (uniaxial tensile test and equibiaxial bulge test)
- Digital Image Correlation (DIC) and Stereo Digital Image Correlation (SDIC) tests
- Design Of Experiments (DOE) and statistical analysis of data
- Hand lay-up of composite plates and tubular sections
- Fabrication of foam mandrels for composites lay-up
- Fabrication of polyurethane foams and silicones

Postgraduate courses

- Continuum Mechanics
- Advanced Mathematics I (Linear Algebra)
- Advanced Mathematics II (Perturbation & PDEs)
- Advanced Composite Materials
- Theory of Shells and Plates
- Finite Element Analysis
- Fracture Mechanics
- Stability of Structures (Buckling)
- Viscoelasticity
- Optimization
- Discreet Element Method

Honors and Awards

Mar 2018	Winner of the "Young Scientist Prize" of the European Mechanics Society (EuroMech award) for the best PhD student presentation in 16th European Mechanics of Materials Conference (EMMC16) in Nantes, France.
Jun 2017	Winner of the 3rd best poster presentation award in the PhD students day of IMEP2 doctoral school, Grenoble Institute of Technology, Grenoble, France.
Apr 2016	Winner of OGS (Ontario Graduate Scholarship) by the Ministry of Training of Ontario government, Canada.
Summer 2015	Admitted to study as PhD student of Mechanical Engineering in University of Grenoble Alpes, France and University of Windsor, Canada.
Jun 2015	Winner of France Ministry of Science scholarship to study as PhD student in Grenoble Institute of Technology for three years.
Summer 2014	Admitted to study as PhD student of Mechanical Engineering through exceptional talents rule of Iran Ministry of Science in Tehran University, Isfahan University of Technology and Shiraz University of Technology.
Sep 2014	Ranked 1st among MSc graduates of Mechanical Engineering (Applied Design), Shiraz University of Technology with GPA = 18.60 out of 20.
Sep 2013-Sep 2014	Member of Exceptional Talents Registry of Shiraz University of Technology.
Summer 2012	Admitted to study as Master student of Mechanical Engineering through exceptional talents rule of Iran Ministry of Science in Shiraz University of Technology and Yasouj University.
Dec 2011	Best researcher of Faculty of Engineering of Yasouj University. (As a BSc student, I have been awarded the best researcher prize of Faculty of Engineering in year 2011 in competition with BSc and MSc students of the faculty.)
Feb 2012	Ranked 2nd among BSc students of Mechanical Engineering (Design of Solids), Yasouj University with GPA = 17.23 out of 20.
Sep 2008-Feb 2012	Member of Exceptional Talents Registry of Yasouj University.
Jun 2006	Ranked 1st among high school students, Alavi High School, Shiraz with GPA = 18.40 out of 20.
Jun 2004	Ranked 2nd in Electronic division of 7th Young Khwarazmi Festival in Fars state, Iran. (As a team, we designed and fabricated a camera robot for use in impassable places.)

Languages

English	Fluent (IELTS overall band score: 7.0, exam date: 1 Aug 2015)
French	Beginner
Farsi (Persian)	Native

Personal Interests

I play Santoor (an Iranian traditional musical instrument) and I was part of different music groups in Iran. It has a great impression on me to participate in a music group and form a music part as a result of a teamwork. I go hiking and camping with my friends to enjoy the tranquility of the country. I am also very keen on traveling and I have visited several countries in Europe. Moreover, I have had the opportunity to study and work in Iran and France and I enjoy collaborating with researchers and professionals from various fields and countries.

References

Yohan Payan
Professor
TIMC-IMAG Laboratory
University of Grenoble Alpes, Grenoble, France
Yohan.Payan@univ-grenoble-alpes.fr

Gregory Chagnon
Associate Professor
TIMC-IMAG Laboratory
University of Grenoble Alpes, Grenoble, France
gregory.chagnon@univ-grenoble-alpes.fr

Abbas Niknejad
Associate Professor
Department of Mechanical Engineering
Yasouj University, Yasouj, Iran
aniknejad@yu.ac.ir

Publications

Journal Publications

1. Thickness and mechanical properties identification of a superficial soft tissue layer using only a volume-based aspiration method. **S.A. Elahi**, N. Connesson, Y. Payan. (Status: To be submitted)
2. Soft tissues mechanical characterization: validation of a volume-based aspiration method on silicones. **S.A. Elahi**, N. Connesson, G. Changnon, Y. Payan. Experimental Mechanics (Status: Under review)
3. Disposable system for in-vivo mechanical characterization of soft tissues based on volume measurement. **S.A. Elahi**, N. Connesson, Y. Payan. Journal of Mechanics in Medicine and Biology, 2018.
4. Energy absorption of composite columns with different cross-sections under lateral compression loading. H. Assaee, J. Rouzegar, **S.A. Elahi**, M.S. Saeedi Fakher, A. Niknejad. (Status: To be submitted)
5. An experimental investigation on the energy absorption of composite-metal tubes subjected to lateral load. S.M. Elahi, S.Ahmad Elahi, **S.A. Elahi**, J. Rouzegar, H. Assaee, A. Niknejad. (Status: To be submitted)
6. Foam-filled columns with rectangular cross-section during the flattening process: theory and experiment. A. Niknejad, S.Ahmad Elahi, S.M. Elahi, **S.A. Elahi**. Iranian Journal of Science and Technology, Transactions of Mechanical Engineering, pages 1–13, 2018.
7. Theoretical study of absorbed energy by empty and foam-filled composite tubes under lateral compression. **S.A. Elahi**, J. Rouzegar, A. Niknejad, H. Assaee. Thin-Walled Structures, Volume 114, Pages 1–10, 2017.

8. Geometrical discontinuities effects on lateral crushing and energy absorption of tubular structures. J. Rouzegar, H. Assaee, A. Niknejad, **S.A. Elahi**. Materials and Design, Volume 65, Pages 343–359, 2015.
9. Theoretical and experimental study on the flattening deformation of the square and rectangular metal columns. A. Niknejad, S.M. Elahi, S.Ahmad Elahi, **S.A. Elahi**. Archives of Civil and Mechanical Engineering, Volume 13, Pages 449–464, 2013.
10. Flattening process of empty and polyurethane foam-filled E-glass/vinylester composite tubes- An experimental study. A. Niknejad, H. Assaee, **S.A. Elahi**, A. Golriz. Composite structures, Volume 100, Pages 479–492, 2013.
11. Experimental investigation on the lateral compression in the foam-filled circular tubes. A. Niknejad, **S.A. Elahi**, G.H. Liaghat. Materials and Design, Volume 36, Pages 24–34, 2012.

Conference Papers

1. Suction based mechanical characterization of two layer tissues, **S.A. Elahi**, N. Connesson, Y. Payan. WCB2018, Dublin, Ireland, July 8-12, 2018. (Status: Accepted)
2. A volume-based aspiration method to estimate in-vivo soft tissues stiffness: evaluation of the device with silicone samples, **S.A. Elahi**, N. Connesson, Y. Payan. EMMC16, Nantes, France, March 26-28, 2018.
3. Hydroforming of the expanded joints by using the circular metal tubes, A. Nikneja, J. Rouzegar, Y. Abdolzadeh, **S.A. Elahi**. AERO 2014, Tehran, Iran, March 3-5, 2014.
4. Experimental study of lateral deformation of rubber-filled brazen tubes, **S.A. Elahi**, J. Rouzegar, H. Assaee, A. Niknejad. X-Mech 2014, Tehran, Iran, February 18-19, 2014.
5. Lateral deformation of rectangular columns with edge notches- A semi empirical investigation, **S.A. Elahi**, J. Rouzegar, H. Assaee, A. Niknejad. X-Mech 2014, Tehran, Iran, February 18-19, 2014.
6. Axial and Lateral compression tests on empty and foam-filled tubes with circular and rectangular cross-sections, A. Niknejad, S.Ahmad Elahi, S.M. Elahi, **S.A. Elahi**, M.M. Abedi. AERO 2013, Tehran, Iran, 2013.
7. Review of previous theoretical studies and introduction of a new relation for flattening of tubes, A. Niknejad, **S.A. Elahi**, S.M. Elahi, S.Ahmad Elahi. AERO 2013, Tehran, Iran, 2013.
8. Review of previous theoretical studies on flattening of composite tubes, A. Niknejad, H. Assaee, **S.A. Elahi**, A. Golriz. CCFA3, Tehran, Iran, December 18-19, 2012.
9. Lateral compression of polyurethane foam-filled metal tubes with peripheral E-glass/ vinylester composite layers, A. Niknejad, H. Assaee, **S.A. Elahi**, A. Golriz. CCFA3, Tehran, Iran, December 18-19, 2012.
10. Study of length and diameter effects on energy absorption behavior of empty and foam-filled metal tubes with fabricated composite layers, A. Niknejad, **S.A. Elahi**, A. Golriz, A. Setayesh. CCFA3, Tehran, Iran, December 18-19, 2012.
11. Experimental investigation of foam and tube fracture in empty and foam-filled circular tubes, A. Niknejad, S.M. Elahi, S.Ahmad Elahi, **S.A. Elahi**. AERO 2012, Tehran, Iran, 2012.
12. Study of lateral load of circular thin-walled tubes during flattening process, A. Niknejad, **S.A. Elahi**. AERO 2012, Tehran, Iran, 2012.
13. A Theoretical Relation for Predicting the Specific Energy Absorption by the Brazen Circular Tubes in Flattening Process, A. Niknejad, G.H. Liaghat, **S.A. Elahi**. ICME 2011, Tehran, Iran, 2011.
14. Specific Energy Absorption by the Circular Tubes with the Polyurethane Foam-Filler in Flattening Process, A. Niknejad, **S.A. Elahi**. EMT 2011, Lviv, Ukraine, November 24-26, 2011.
15. Prediction of the stress-strain diagram of circular tube material based on lateral compression tests, A. Niknejad, **S.A. Elahi**. EMT 2011, Lviv, Ukraine, November 24-26, 2011.

Invited talks and attendance

3–7 September 2018	8th Summer School on Biomechanics, from Protein to Tissue to Organ: Modeling and Computation, Graz University of Technology, Austria. Coordinated by: Prof. GA Holzapfel and Prof. RW Ogden.
2 January 2018	In-vivo and in-situ mechanical characterization of soft living tissues, University of Tehran, Tehran, Iran.
25 December 2017	In-vivo and in-situ mechanical characterization of soft living tissues, Isfahan University of Technology, Isfahan, Iran.
17 December 2011	Experimental investigation on the lateral compression in the foam-filled circular tubes, Research week of Yasouj University, Yasouj, Iran.

Professional Memberships

2018	European Society of Biomechanics.
2018	European Mechanics Society.