Personal Data

Name:	Fatemeh Sadeghi
Position:	Associate Professor
Department:	Engineering Sciences
Faculty	Advanced Technologies
University:	University of Mohaghegh Ardabili
City/Country	Namin/Iran
Mobile:	+98 9112315317
Email addresses:	f.sadeghi@uma.ac.ir, fatemeh_sadeghi_64@yahoo.com
Academic pages:	Google scholar: https://scholar.google.com/citations?user=vTpvhgkAAAAJ&hl=en Scopus: https://www.scopus.com/authid/detail.uri?authorId=57014717800

Education

PhD
September 2011-March 2016

Field: Mechanical engineering
Specialization: Applied Mechanics
University: University of Guilan, Rasht, Department of Mechanical Engineering
Supervisors: Reza Ansari (Professor), Mansour Darvizeh (Professor)
Thesis Title: Modeling of gigahertz nano-oscillators with tubular outer shell using the continuum approximation
GPA: 19.30/20

MSc
September 2008-June 2011

Field: Mechanical engineering
Specialization: Applied Mechanics
University: University of Guilan, Rasht, Department of Mechanical Engineering
Supervisor: Reza Ansari (Professor)
Advisor: Abolfazl Darvizeh (Professor)
Thesis Title: An investigation into ultra-frequency nanoscale oscillators
GPA: 20/20

BSc
September 2003-July 2007

Field: Mechanical engineering
Specialization: Heat & Fluid Mechanics
University: University of Guilan, Rasht, Department of Mechanical Engineering
Supervisors: Kazem Atashkari (Associate Professor)
Thesis Title: Modeling of a four-stroke engine with variable specific heat and octane fuel
GPA: 19.50/20

Research Interests

- Applications of material science and nanotechnology in engineering and medicine
- Nanomechanics: Nonlinear vibration, pull-in behavior of MEMs and NEMs
- Mathematical modelling of Van der Waals interactions between nano-materials (carbon nanotubes, graphene sheets, fullerenes, nanocones, nanotori, lipid and peptide nanotubes, bundles, Aquaporins,…) using continuum mechanics
- Continuum modeling of molecular interactions arising in nanobiotechnology
- Continuum modelling of high-frequency nanomechanical oscillators
- Modeling nanotechnology-based drug delivery systems
- Modelling adsorption of DNA & RNA into nano-pores
- Modelling gas storage in molecular nanosystems
- Predicting properties of nanomaterials using analytical and numerical techniques
- Mathematical modelling of nanostructures and geometric issues of nanostructers
- Continuum models for joining of nanostructures

Teaching Experiences

Department of Mechanical Engineering, University of Guilan, Rasht, Iran (2011-2017)

- **Advanced Engineering Mathematics** to Undergraduate and Postgraduate Mechanical Engineering Students.
- **Static and Mechanics of Materials** to Undergraduate Chemical Engineering Students.
- **Mechanical Engineering Drawing** to Undergraduate Textile Engineering Students.

Department of Mechanical Engineering, Ahrar Institute of Technology and Higher Education, Guilan, Rasht, Iran (2012-2017)

- **Static, Mechanics of Materials, Dynamics of Machines, Mechanical Engineering Drawing with SolidWorks, Differential Equations, Numerical Calculations, Programming with Matlab, Heat Transfer, Control Systems for Heating, Ventilating and Air Conditioning** and **Technical Language** to Undergraduate Mechanical, Electrical and Civil Engineering Students.

Department of Mechanical Engineering, Applied Science Center: Tidewater, Guilan, Anzali, Iran (2012)

- **Dynamics** and **Mechanical Engineering Design** to Undergraduate Mechanical Engineering Students.

Department of Mechanical Engineering, Applied Science Center: Borhan Nirooye Shomal, Guilan, Rasht, Iran (2013-2014)

- **Thermodynamics** and **Fuels and Combustion** to Undergraduate Mechanical Engineering Students.

Department of Mechanical Engineering, Rahbord Shomal of Technology and Higher Education, Guilan, Rasht, Iran (2016-2017)

- **Mechanical Engineering Drawing** to Undergraduate Mechanical Engineering Students.

Department of Engineering Sciences, Faculty of Advanced Technologies, University of Mohaghegh Ardabili (Since 2019)

- **Fluid Mechanics & Laboratory of Fluid Mechanics, Heat Transfer, Statics, Mechanical Vibrations, Engineering Economics, Differential Equations, Engineering Mathematics, Numerical Calculations, Computational Fluid Dynamics, Computer Programming** and **Carrier HAP: Hourly Analysis Program** to Undergraduate Engineering Sciences Students.
- **Fundamental of Mechatronics, Advanced Mechanical Vibrations** and **Finite Elements Methods** to Postgraduate Mechatronics Engineering Students.

Industrial Experiences

- Member of Guilan Construction Engineering Organization (Professional license No. 11-400-020-72).
- Having the license of Design and Supervision at Mechanical Engineering (Grade 2).
- Gas piping supervisor of residential and commercial buildings.
- Collaboration in an industrial project entitled "**Optimization of hot water boilers in central heating systems**" in Mehrkabodan deylam Company, Rasht, Iran (2020-2021).
- Collaboration in an industrial project entitled "**Design of heat recovery boilers for simultaneous generation of electricity and heat**" in Daboosanat Company, Mahmudabad, Iran (2023).
- Setting up the "**Solar Energy Laboratory**" in the Faculty of Advanced Technologies, University of Mohaghegh Ardabili, Namin, Iran.

Executive Experiences

- **Academic advisor for undergraduate students in the field of Energy Engineering**, Faculty of Advanced Technologies, University of Mohaghegh Ardabili, Namin, Iran (2020-2024).
- **Academic advisor of Student Scientific Association in the field of Engineering Sciences**, Faculty of Advanced Technologies, University of Mohaghegh Ardabili, Namin, Iran (2020-2021).
- **Head of Engineering Department**, Faculty of Advanced Technologies, University of Mohaghegh Ardabili, Namin, Iran (since 2024).

Mentoring Experiences

Graduate mentor, University of Guilan, Rasht, Iran

- Mentored one undergraduate Mechanical Engineering student with the following title for final dissertation: **Determination of join regions between carbon nanostructures using variational calculus**.
- Mentored one Postgraduate Mechanical Engineering student with the following title for final dissertation: **Adsorption of DNA molecule into different carbon nanostructed materials using the continuum approximation**.

Graduate mentor, Faculty of Advanced Technologies, University of Mohaghegh Ardabili, Namin, Iran

Guided the students in preparation and presentation of final dissertation and research findings with the following titles

- **Application of smart nanomaterials in engineering and medicine**
- **Encapsulation of Buckyball molecules inside carbon nanotubes using continuum approximation**
- **Modelling the interactions between C_{60} fullerene and graphene sheet**
- **Design and calculation of cooling and heating losses in buildings**
- **Basic principles and design considerations for condensing boilers**
- **Comparing the performance of absorption and compression chillers**
- **Investigating the effect of nanoparticles in increasing the efficiency of heat exchangers**
- **Solutions to increase the performance of Stirling engine**
- **Calculating the efficiency of combined cycle power plants**
- **Comparing the performance of parallel and series electrical hybrid vehicles in terms of fuel consumption**

Honors

- Qualified by graduating with honors and ranking 2rd among undergraduate Mechanical Engineering students (2007).
- Qualified by graduating with honors and ranking 1st among postgraduate Mechanical Engineering students (2011).
- Graduated from Bachelor, Master and PhD courses with excellent grade (2007, 2011&2016).
- Having certificate for Highly Cited Research in Mechanics Research Communications in 2016 (Paper Title: Continuum and molecular dynamics study of C_{60}-fullerene nanotube oscillators).

Publications

Published Papers in Peer-Reviewed Journals

J1. **Sadeghi F**, Ansari R. **Mechanics of ellipsoidal carbon onions inside multiwalled carbon nanotubes**. *Journal of Nanotechnology in Engineering and Medicine*. 2012; 3 (1): 011002.

J2. Ansari R, **Sadeghi F**. **On the oscillation frequency of ellipsoidal fullerene–carbon nanotube oscillators**. *Journal of Nanotechnology in Engineering and Medicine*. 2012; 3 (1): 011001.

J3. Ansari R, Kazemi E, Mahmoudinezhad E, **Sadeghi F**. **Preferred position and orientation of anticancer drug cisplatin during encapsulation into single-walled carbon nanotubes**. *Journal of Nanotechnology in Engineering and Medicine*. 2012; 3 (1):010903.

J4. Ansari R, **Sadeghi F**, Motevalli B. **A comprehensive study on the oscillation frequency of spherical fullerenes in carbon nanotubes under different system parameters**. *Communications in Nonlinear Science and Numerical Simulation*. 2013; 18 (3): 769-84.

J5. Ansari R, **Sadeghi F**, Ajori S. **Continuum and molecular dynamics study of C_{60} fullerene–carbon nanotube oscillators**. *Mechanics Research Communications*. 2013; 47: 18-23.

J6. Ansari R, Alipour A, **Sadeghi F**. **Oscillatory characteristics of carbon nanotubes inside carbon nanotube bundles**. *Journal of Applied Physics*. 2012; 112 (12):124310.

J7. Ansari R, Mahmoudinezhad E, **Sadeghi F**. **A new equivalent spring model for determining the G-band mode frequency of single-walled carbon nanotubes.** *Carbon*. 2013; 55: 44-52.

J8. Ansari R, **Sadeghi F**, Alipour A. **Oscillation of C_{60} fullerene in carbon nanotube bundles.** *Journal of Vibration and Acoustics*. 2013; 135 (5): 051009.

J9. Ansari R, **Sadeghi F**, Shojaei MF. **On the mechanics of ellipsoidal fullerenes inside open carbon nanocones: A novel numerical approach**. *Nano*. 2014; 9 (03): 1450034.

J10. Ansari R, Shojaei MF, Mohammadi V, Gholami R, **Sadeghi F**. **Nonlinear forced vibration analysis of functionally graded carbon nanotube-reinforced composite Timoshenko beams**. *Composite Structures*. 2014; 113: 316-27.

J11. Hosseini K, **Sadeghi F**, Ansari R. **First integral method for solving nonlinear physical systems of partial differential equations**. *Journal of Nature Science and Sustainable Technology*. 2014; 8 (3): 391.

J12. Ansari R, **Sadeghi F**. **Mechanics of nested spherical fullerenes inside multi-walled carbon nanotubes**. *European Journal of Mechanics-A/Solids*. 2015; 49: 283-92.

J13. Ansari R, **Sadeghi F**. **On the mechanics of C_{60} fullerene inside open carbon nanocones: A continuum study**. *Physica E: Low-dimensional Systems and Nanostructures*. 2015; 69: 1-12.

J14. Ansari R, Mirnezhad M, **Sadeghi F**. **Elastic properties of chiral carbon nanotubes under oxygen adsorption**. *Physica E: Low-dimensional Systems and Nanostructures*. 2015; 70: 129-34.

J15. Ansari R, Ajori S, **Sadeghi F**. **Molecular dynamics investigation into the electric charge effect on the operation of ion-based carbon nanotube oscillators**. *Journal of Physics and Chemistry of Solids*. 2015; 85: 264-272.

J16. Ansari R, Oskouie MF, **Sadeghi F**, Bazdid-Vahdati M. **Free vibration of fractional viscoelastic Timoshenko nanobeams using the nonlocal elasticity theory**. *Physica E: Low-dimensional Systems and Nanostructures*. 2015; 74: 318-27.

J17. Ansari R, Hasrati E, Gholami R, **Sadeghi F**. **Nonlinear analysis of forced vibration of nonlocal third-order shear deformable beam model of magneto–electro–thermo elastic nanobeams**. *Composites Part B: Engineering*. 2015; 83: 226-41.

J18. **Sadeghi F**, Ansari R, Darvizeh M. **Oscillatory characteristics of metallic nanoparticles inside lipid nanotubes**. *The European Physical Journal D*. 2015; 69 (12): 285-300.

J19. Ansari R, **Sadeghi F**, Darvizeh M. **Continuum study on the oscillatory characteristics of carbon nanocones inside single-walled carbon nanotubes**. *Physica B: Condensed Matter*. 2016; 482: 28-37.

J20. Ansari R, Oskouie MF, Gholami R, **Sadeghi F**. **Thermo-electro-mechanical vibration of postbuckled piezoelectric Timoshenko nanobeams based on the nonlocal elasticity theory**. *Composites Part B: Engineering*. 2016; 89: 316-327.

J21. **Sadeghi F**, Ansari R, Darvizeh M. **Potential energy, force distribution and oscillatory motion of chloride ion inside electrically charged carbon nanotubes**. *Physica E: Low-dimensional Systems and Nanostructures*. 2016; 80: 69-81.

J22. **Sadeghi F**, Ansari R, Darvizeh M. **Continuum modeling investigation of gigahertz oscillators based on a C_{60} fullerene inside cyclic peptide nanotubes**. *The European Physical Journal Plus*. 2016; 131 (2): 1-22.

J23. **Sadeghi F**, Ansari R, Darvizeh M. **Mechanics of metallic nanoparticles inside lipid nanotubes: Suction and acceptance energies**. *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science.* 2017; 231(13):2540-2553.

J24. Gholami R, Darvizeh A, Ansari R, **Sadeghi F**. **Vibration and buckling of first-order shear deformable circular cylindrical micro-/nano-shells based on Mindlin's strain gradient elasticity theory**. *European Journal of Mechanics-A/Solids*. 2016; 58: 76-88.

J25. **Sadeghi F**, Ansari R, Darvizeh M. **Gigahertz nanomechanical oscillators based on ions inside cyclic peptide nanotubes: A continuum study**. *Zeitschrift für angewandte Mathematik und Physik*. 2016; 67: 1-23.

J26. Ansari R, **Sadeghi F**, Ajori S. **Oscillation characteristics of carbon nanotori molecules along carbon nanotubes under various system parameters**. *European Journal of Mechanics-A/Solids.* 2017; 62: 67-79.

J27. **Sadeghi F,** Ansari R. **Mechanical oscillatory behavior of a C_{60} fullerene tunneling through open carbon nanocones**. *The European Physical Journal Plus.* 2017; 132: 309.

J28. Oskouie MF, Ansari R, **Sadeghi F**. **Nonlinear vibration analysis of fractional viscoelastic Euler-Bernoulli nanobeams based on the surface stress theory**. *Acta Mechanica Solida Sinica*. 2017; 30: 416-424.

J29. Ansari R, Moradweysi P, Hosseini K, **Sadeghi, F. Application of modified Adomian decomposition method to pull-in instability of nano-switches using nonlocal Timoshenko beam theory**. *Applied Mathematical Modelling.* 2018; 54, 594-604.

J30. Ajori S, Ansari R, **Sadeghi F. Molecular dynamics study of gigahertz nanomechanical oscillators based on an ion inside a series of electrically charged carbon nanotubes**. *European Journal of Mechanics-A/Solids*. 2018; 69, 45-54.

J31. **Sadeghi F,** Ansari R. **Continuum study on the mechanics of ion-based carbon nanocones as gigahertz oscillators**. *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science.* 2019; 233 (9), 3259-3276.

J32. **Sadeghi F,** Ansari R. **A detailed parametric study on the operating frequency of chloride ion-electrically charged carbon nanotube oscillators**. *Bulletin of Materials Science.* 2019; 42 (4), 165.

J33. **Sadeghi F,** Ajori S, Ansari R. **Continuum modeling of ion-selective membranes constructed from functionalized carbon nanotubes**. *European Physical Journal Plus.* 2020; 135, 553.

J34. Ajori S, **Sadeghi F**, Ansari R. **Nano-oscillators based on a C_{60} fullerene inside open carbon nanocones: a molecular dynamics study**. *Journal of the Brazilian Society of Mechanical Science and Engineering*. 2020; 42 (9), 1-10.

J35. Ajori S, **Sadeghi F**, Ansari R. **Dynamic behavior of chloride ion-electrically charged open carbon nanocone oscillators: A molecular dynamics study**. *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science*. 2021; 235 (21): 5709-5717.

J36. Sheikhlou M, **Sadeghi F**, Najafi S, Azimloo H. **Surface and nonlocal effects on the thermoelastic damping in axisymmetric vibration of circular graphene nanoresonators**. *Acta Mechanica Solida Sinica*. 2021; 29:1-14.

J37. **Sadeghi F**, Ansari R. **Van der Waals interactions and oscillatory behaviour of carbon onions interacting with a fully constrained graphene sheet**. *Bulletin of Materials Science*. 2021;44(1):1-10.

J38. Gholami Y, Ansari R, Gholami R, **Sadeghi F**. **Size-dependent free vibration and buckling analysis of magneto-electro-thermo-elastic nanoplates based on the third-order shear deformable nonlocal plate model**. *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science*. 2022; 236(14): 8116-8133.

J39. **Sadeghi F**. **Encapsulation of immobilized lysozyme enzyme inside various types of nanotubes: a continuum study**. *The European Physical Journal Plus*, 2022; 137(7): 1-14.

J40. **Sadeghi F**, Ajori S. **Dynamic behavior of lysozyme enzyme inside titania nanotubes: a continuum approach**. *The European Physical Journal Plus*. 2022; 137(10): 1178.

J41. Kia A, **Sadeghi F,** Ansari R. **Continuum modeling of fullerene encapsulation inside two-section carbon and boron nitride nanotubes**. *Bulletin of Materials Science*. 2024; 47(2): 105.

J42. Ajori S, Eghbalian M, **Sadeghi F. Graphullerene: a fully atomistic analysis of the tensile characteristics under temperature variation**. *Advanced Engineering Materials*. 2024; 26(5): 2301128.

J43. Ajori S, **Sadeghi F. Design of high-frequency carbon nanotube–carbon nanotorus oscillators for energy harvesting: A molecular dynamics study**. *Langmuir*. 2024; 40(9):4811-4823.

J44. **Sadeghi F**, Ansari R, Darvizeh M. **Free vibration analysis of functionally graded carbon nanotube-reinforced composite cylindrical shells resting on elastic foundation in thermal environment**. *Iranian Journal of Science and Technology of Ahrar*. 2014; 1(1), 29-39 (In Persian).

J45. Ajori S, **Sadeghi F. A molecular dynamics study on the buckling analysis of functionalized graphene with nylon (6,6) in aqueous environment**. *Journal of Aerospace Mechanics*. 2023; 19 (4), 1-10 (In Persian).

J46. **Sadeghi F. Modeling the oscillatory behavior of carbon nano-onions inside single-walled carbon nanotubes based on the continuum approximation method**. *Journal of Aerospace Mechanics*. 2023; 19 (4), 135-148 (In Persian).

J47. **Sadeghi F,** Sadeghi M. **Presenting a continuum model for analyzing the oscillatory behavior of buckyball molecule inside carbon nanotorus**. *Journal of Aerospace Mechanics*. 2025; 20 (4), 23-42 (In Persian).

Conference Presentation

C1. Ansari R, **Sadeghi F. On the frequency of C_{60} fullerene-carbon nanotube oscillators**. *2nd Conferences on Applications of Nanotechnology in Sciences, Engineering and Medicine, Mashhad, Iran, Islamic Azad University, Mashhad Branch*, 16-17 May 2011 (Oral Presentation).

C2. Ansari R, **Sadeghi F. An investigation into oscillatory behavior of multi-walled spherical fullerene inside single-walled carbon nanotubes**. *1st Regional Conference on Mechanical Engineering, Lahijan, Iran, Islamic Azad University, Lahijan Branch*, 11 December 2011 (In Persian, Oral Presentation).

C3. **Sadeghi F**, Ansari R, Darvizeh M. **Free vibration analysis of functionally graded carbon nanotube-reinforced composite cylindrical shells.** *8th Student Conference on Mechanical Engineering, Rasht, Iran, University of Guilan,* 7-9 October 2014 (In Persian, Oral Presentation).

C4. **Sadeghi F**, Ansari R. **Oscillatory behaviour of a C_{80} fullerene inside single-walled carbon nanotubes.** *4th International Conference on Acoustics and Vibration, Tehran, Iran, University of Science & Technology,* 10-11 December 2014 (Oral Presentation).

C5. Ansari R, **Sadeghi F. On the acceptance and suction of multi-walled spherical fullerenes inside multi-walled carbon nanotubes**. *23th Annual International*

Conference on Mechanical Engineering, Tehran, Iran, Amirkabir University of Technology, 12-14 May 2015 (In Persian, Oral Presentation).

C6. Ansari R, **Sadeghi F,** Ajori S. **Nano-oscillators based on a chloride ion inside electrically charged carbon nanotubes**. *5th International Conference on Acoustics and Vibration, Tehran, Iran, University of Tehran*, 25-26 November 2015 (Oral Presentation).

C7. Sadeghi F. Nano-oscillators based on ions inside electrically charged open carbon nanocones. *8th International Conference on Nanostructures (ICNS8), Sharif University of Technology, Tehran-Iran, Tehran-Iran*, 18-20 November 2020 (Oral Presentation).

C8. Sadeghi F. Encapsulation of gold nanoparticles into lipid nanotubes. *6th international conference on Mechanical Engineering, Materials and Metallurgy, Tbilisi, Gorgia,* 22 October 2022 (Oral Presentation).

C9. Sadeghi F. Oscillatory behavior of nested spherical fullerenes in the vicinity of a single layer graphene sheet. *The 12th International Conference on Acoustics and Vibration, University of Tehran,* 14-15 December 2022 (Oral Presentation).

C10. Sadeghi F. **The effect of electric charge on the operating frequency of ion-functionalized carbon nanotube oscillators.** *The 31th Annual International Conference of Iranian Society of Mechanical Engineers & 9th Conference on Thermal Power Plants, Tehran-Iran,* 9-11 May 2023 (Oral Presentation).

C11. Sadeghi F. **Oscillation of carbon nanosectors orbiting inside carbon nanotorus molecules.** *The 11th International Conference on Science and Development of Nanotechnology, Hungary,* 20 October 2023 (Oral Presentation).

C12. Sadeghi F. **On the oscillatory behavior of silver and gold nanoparticles inside lipid nanotubes.** *The 14th International Conference on Acoustics and Vibrations, Kharazmi University, Karaj-Iran,* 11-12 December 2024 (Oral Presentation).

Published Books

B1. Ansari R, **Sadeghi F.** (2015). **Engineering Mathematics**. *Kadusan Press, Rasht, Iran,* Volume 1 (In Persian).

B2. Ansari R, Gholami R, **Sadeghi F.** (2016). **Calculus of Variations and its Applications**. *Kadusan Press, Rasht, Iran,* Volume 1 (In Persian).

B3. Ansari R, **Sadeghi F,** Faghih Shojaei M. (2025). **Numerical Calculations with operator-oriented attitude**. University of Guilan Press, Volume 1 (In Persian).

Language

English: (Reading & Speaking & Writing): Fluent

Technical Skills

- Programming languages and mathematical packages: **Matlab & Maple.**
- Computer aided design: **AutoCAD**, **SolidWorks** and **Mechanical Desktop.**
- Carrier Hourly Analysis Program

Professional Activities

Reviewer at the following journals

- **Journal of Physics and Chemistry of Solids**
- **Carbon**
- **International Journal of Mechanical Sciences**
- **Modern Physics Letters B**
- **Combinational Chemistry & High Throughput Screening**
- **Journal of Physica E**
- **Materials Today: Proceedings**
- **Communications in Nonlinear Science and Numerical Simulation**
- **Journal of Aerospace Mechanics**
- **Proceedings of the Institution for Mechanical Engineers, Part N: Journal of Nanomaterials, Nanoengineering and Nanosystems**
- **International Journal of Thermofluids**
- **Materials Chemistry and Physics**

References

Akbar Safarzadeh, Professor
Department of Civil Engineering, University of Mohaghegh Ardabili, Ardabil, Iran
Tell: +98 9122092599, Email: safarzadeh@uma.ac.ir.

Kazem Atashkari, Associate Professor
Faculty of Mechanical Engineering, University of Guilan, Rasht, Iran.
Tell: +98 9111311506, Email: atashkar@guilan.ac.ir.

Reza Ansari, Professor
Faculty of Mechanical Engineering, University of Guilan, Rasht, Iran.
Tell: +98 9113310486, Email: project.dransari@gmail.com.