

MEHDI ESKANDARZADE

PhD.; Mechanical Engineering;

Associate Professor & Professional Engineer

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PROFESSIONAL SUMMARY

I am associate professor at Public University of Mohaghegh Ardabili (UMA). I have devoted my research and scientific efforts mainly to study of the metallurgy and the correlation between material susceptibility and the corrosion/crack performance of carbon steels in upstream and midstream oil and gas operating condition and hydrogen environment.

Besides the academic endeavour, I have provided 12+ years of services in oil and gas and steel making industries. I have a permanent role in UMA, however, through industrial agreement program between our university and me, I am working as the CEO at the Arkan Petrosanat Namin mini-refinery.

Besides collaboration in developing and reviewing several standards and guidelines, I have participated in developing the first Iranian national standard for API-X60MS grade line pipe steel used in sour services.

RESEARCH INTERESTS

Numerical simulation, lab-scale and full-scale experimental analysis of mechanical and metallurgical parameters of fossil-free steel making industries. It extends to:

- Risk based inspection (RBI)
- Microstructural analysis (SEM, TEM, OM)
- Technical Inspection
- Finite Element Analysis

EDUCATION

22/01/2017 **Doctor of Philosophy (Ph.D.)**, Mechanical Engineering, University of Tehran, Iran.
University of Tehran is ranked #1 among Iranian Universities and ranked 601–800 among world universities by Times (Supervisor: Prof. Abolfazl Masoumi & Prof. Ghader Faraji)

Dissertation Title: Numerical simulation and experimental investigation of the production of nanostructured tubular parts using incremental high-pressure torsion process.

10/06/2007 **Master of Science**, Mechanical Engineering, Urmia University, Iran, GPA 18.18 out of 20

Thesis title: Modelling electromagnetic acoustic transducers as an intelligent PIG for inspection of oil and gas pipelines

04/09/2005 **Bachelor of Science**, Mechanical Engineering, Tabriz University, Iran, GPA 15.54 out of 20

SCIENTIFIC RECORD

- [Google Scholar](#): h-index: 9; Citations: 281
- [ORCID Profile](#): <http://orcid.org/0000-0002-9139-4628>
- [Scopus](#): h-index: 7; Citations: 141
- [UMA Profile](#): <https://bit.ly/3fmytDX>

ACADEMIC & INDUSTRIAL R&D CONTRIBUTION

- “Experimental investigating of improving construction conditions in Polyethylene gas network projects with the aim of reducing construction restrictions (especially weather conditions”; National Gas Company; Iran; 2018 – 2020.
- Repair of through wall defects in steel/concrete pipeline using composite wrap, University of Tabriz; Iran. 2015.
- Selection of best sensors for intelligent pigging of natural gas pipelines, UUT, Urmia; Iran. 2007.
- Standard of the production of clean steel API-5L X60MS grade for sour service application, Standard Committee of Clean Steels of Iran, 2019.
- HIC/SSC experimental investigation on plates and pipes as per NACE TM-0284, NACE TM-0177 and providing solutions for non-conformities.

ACADEMIC CAREER HISTORY

Sep. 2018 – Now	Assistant Professor, Full-time, Mechanical Engineering department, University of Mohaghegh Ardabili (UMA), Ardabil, Iran;	
https://bit.ly/3fmytDX		
Sep. 2014 – Aug. 2018	Tutor, Part-time, Mechanical Engineering department, University of Tehran; Tehran, Iran.	
Feb. 2009 – Feb. 2012	Lecturer, Full-time, Mechanical Engineering department, Urmia University of Technology (UUT); Urmia, Iran.	

CURRENT LECTURING COURSES (AT UMA)

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| – Advanced Computational Methods, MSc course | – Finite Element Analysis Using Abaqus software |
| – Non-destructive testing and inspection, BSc & MSc courses | – Metal Forming, MSc course |

INDUSTRIAL CAREER HISTORY

August, 2023 – Now	CEO, Arkan Petrosanat Namin mini-refinery, IRI	
March, 2021 – August, 2023	Project Manager, Uzinexpert at Mobarakeh Steel Company, IRI	
May 2018 – March, 2021	Risk Based Inspection (RBI) expert, Part-time, LifeTech Engineering, UK	
Jan. 2019 – Dec. 2019	Senior Corrosion Advisor, Part-time, Petroleum Engineering & De Company (PEDEC), Iran.	
Jan. 2017 – Sep. 2018	Senior Corrosion Management Engineer, Full-time, IS Group, Iran	

Mar. 2012 – Jan. 2017

Senior Technical Coordinator, Full-time, SGS Group, Iran



PROJECTS

CLIENTS: SAUDI ARABIAN OIL COMPANY, Saudi Arabia, April 2023-2024

RBI Expert

- Corrosion Study: NORTH RAS TANURA REFINERY & JUAYMAH NGL PROJECTS DIVISION, REFINING & NGL PROJECTS DEPARTMENT
- C3 Refrigeration Unit
- C4 Refrigeration Unit
- C3 Storage Tanks 3.4 C4 Storage Tank
- C3 Tank Vapor Recovery Unit
- C4 Tank Vapor Recovery Unit
- PRODUCT

CLIENTS: Thyna Petroleum Services (TPS), Tunisia, September 2023-2024

RBI Expert

- RBI at crude oil flowline from Cercina South to the manifold at Delta platform using RBLX software
- Including Pipelines
- Segmentation
- ILI reports

CLIENTS: Petroleum Engineering and Development Company (PEDEC), Iran, March 2023-2023

Project leader

- Fitness-For-Service (FFS) for abounded piping and equipment in Gurreh strategic storage tanks.
- Including Pipelines, piping, Flanges
- Phassed Array UT
- VT & Guided waves

CLIENTS: PETROINEOS GRANGEMOUTH REFINERY, UK, April 2020-2021

RBI Expert

- RBI at Grangemouth Refinery using RBLX software
- Including Refinery Equipment (e.g. PVs, HEs) and Piping Circuits
- Corrosion Loops
- Damage Mechanisms
- Risk Assessments
- Inspection Planning
- Non-Intrusive (NII) Inspections

CLIENTS: NOURI PETROCHEMICAL COMPLEX, IRAN, Oct 2020-Jan 2022

RBI Facilitator

- RBI at Nouri Petrochemical Complex using RBLX software
- Including Equipment (e.g. PVs, HEs, Reactors, Furnaces) and Piping Circuits
- Corrosion Loops

- Damage Mechanisms
- Risk Assessments
- Inspection Planning
- Integrity Operating Windows (IOWs)

CLIENTS: RISKTEC/L&T/ADNOC, ABU DHABI/UAЕ, 2018-2019**RBI Expert**

- RBI Study on Haliba Oil Field using RBLX Software
- Including Onshore Pipelines, Piping and Equipment
- Corrosion Study
- Corrosion Loops
- RBI Assessment
- TMLs and CMLs Identifications
- Providing RBLX RBI Software

POSTGRADUATE STUDENTS**Supervisory role at University of Mohagheh Ardabili:**

- Mehdi Zareyi, PostDoc student, 2023-2024
- Milad Zeidi, MSc degree, thesis title: Modelling of carbon control using hydrogen metallurgy in steel making, 2022
- Meysam Najafi Ershadi, MSc degree, thesis title: "Energy consumption consideration and risk assessment of the hydrocarbon carrying pipelines, 2021.
- Zohre Khadiri Niyazmand, MSc degree, thesis title: "Finite Element Simulation of faulty electro-fusion joint in polyethylene gas pipes", 2021
- Aref Pourali, MSc degree, thesis title: "Feasibility study of Replacing Internal Inspections of Pressure Vessels With Non-Intrusive Inspection (NII) Methods in Petrochemical Industry", 2021.
- Siyamak Shiri, MSc degree, thesis title: "Preparing the Atlas of the active manufacturing industries in Ardabil Province and identifying the root cause of problems in industrial section of the Ardabil province", 2021.
- Armin Asgarzade, MSc degree, thesis title: "Developing a Risk Based Inspection methodology of piping system of the geothermal power plant", 2020

SELECTED PUBLICATIONS

- Abbaszadeh, Behzad, Mohammad Morad Sheikhi, Mohammad Meghdad Fallah, and **Mehdi Eskandarzade**. "Effect of Frictional Contact Surface on Maximum Pressing Load during Equal Channel Angular Pressing Process." *Journal of Materials Engineering and Performance* 33, no. 2 (2024): 741-750.
- Abbaszadeh, B., M. M. Sheikhi, M. M. Fallah, and **M. Eskandarzade**. "A novel equal channel angular pressing design to eliminate punch deflection and to reduce the pressing force." *Materialwissenschaft und Werkstofftechnik* 54, no. 3 (2023): 294-301.
- **Eskandarzade, Mehdi**, Tahereh Masalehdan, Abolfazl Tutunchi, Karim Osouli-Bostanabad, Robin Hildyard, Stephen Rickie Bewsher, and Mahdi Mohammadpour. "Study of tribological properties of bulk nanostructured aluminum and copper samples applicable in automotive bearing application." *Journal of Materials Engineering and Performance* (2023): 1-11.
- **M. Eskandarzade**, R. Hildyard, S. R. Bewsher, K. Osouli-Bostanabad, A. Tutunchi, M. Mohammadpour, Tribological Properties of Bulk Nanostructured Samples for Automotive Bearing Application, Part B: *Journal of Engineering Manufacture*, Under Review, 2022.

- **Mehdi Eskandarzade**, Reza Shahrivar, R. M. Chandima Ratnayake, Umair Niaz Bukhari, An Optimal Approach for Semi-Quantitative Risk-Based Inspection of Pipelines, *Journal of Pipeline Systems Engineering and Practice*, 2022, (Accepted for publication)
- Abolfazl Tutunchi, **Mehdi Eskandarzade**, Karim Osouli, Risk assessment of electrofusion joints in commissioning of polyethylene natural gas networks, *International Journal of Pressure Vessels and Piping*, 2022, <https://doi.org/10.1016/j.ijpvp.2022.104627>
- Meysam Najafi Ershadi, **Mehdi Eskandarzade**, Seyed Mohammad Arab, Chandima Ratnayake, Consequence Assessment of hazardous liquid Pipelines using Gray Relational Analysis, *Journal of Pipeline Systems Engineering and Practice*, under revision, 2022.
- **Mehdi Eskandarzade**, Milad Zeidi, Ali Kalaki, Potential use of hydrogen energy in steel making industry, *ICREDG2022*, Mashhad, Iran, Feb. 10-11, 2022.
- Milad Zeidi, **Mehdi Eskandarzade**, Techno-economic study of using hydrogen in steel making industries of Iran, *3th international conference on new technologies in oil, gas and petrochemical*, 15-17 February, 2022.
- Rohan Jivan, **Mehdi Eskandarzade**, Stephen Bewsher, Michael Leighton, Mahdi Mohammadpour, Sina Saremi-Yarahmadi, "Application of Solid Lubricant for Enhanced Frictional Efficiency of Deep Drawing Process", *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science* 236, no. 1 (2022): 624-634
- Keith Walton, **Mehdi Eskandarzade**, "Shutdown & Turnaround (TAR) optimisation-the criteria for selecting equipment for Non-Intrusive inspection", *4th international conference on Risk Based Inspection & Preventive Maintenance*, Delhi, India, 9 April, 2021.
- **Mehdi Eskandarzade**, Meysam Najafi, experimental and numerical investigation of the frictional forces in equal channel angular pressing, *uludağ university journal of the faculty of engineering*, Vol. 26, No. 1, 2021. DOI: 10.17482/uumfd.818759
- Masalehdan, T., **Eskandarzade, M.**, Tutunchi, A., Kim, B., Questa, H., Mohammadpour, M. and Asl, M.S. Two-dimensional clay nanosheet-reinforced polytetrafluoroethylene composites and their mechanical/tribological studies, *Materials Today Communications*, 26, p.102026, 2021.
- Kalaki, A., **Eskandarzade, M.**, Minaei, A. and Ratnayake, R.C., Effect of Secondary Cooling Rate in Corrosion Performance of Line Pipe Material in Sour Service Applications. *Journal of Pipeline Systems Engineering and Practice*, 12(2), p.06021001, 2021.
- Shabnam Majdi Taghi dizaj, Meysam Najafi Ershadi, Ali Kalaki, **Mehdi Eskandarzade**, Hadi Ghaebi, Techno-economic study of the necessity of helium extraction from natural gas in Iran, *2th international conference on new technologies in oil, gas and petrochemical*, 23-24 February, 2021.
- Oghli, H.M., Akhbari, M., Kalaki, A. and **Eskandarzade, M.**, Design and Analysis of the Cathodic Protection System of Oil and Gas Pipelines, Using Distributed Equivalent Circuit Model. *Journal of Natural Gas Science and Engineering*, p.103701, (84) online available, 2020.
- **Mehdi Eskandarzade**, R.M. Chandima Ratnayake, Meysam Najafi Ershadi, Mechanization of Qualitative Risk Based Inspection Analysis", *International Conference on Industrial Engineering and Engineering Management (IEEM2020)*, Singapore, 14-17 December 2020.
- **M. Eskandarzade**, A. Tutunchi, K. Osouli-Bostanabad, "Risk Assessment of the Urban Natural Gas Polyethylene Piping System" *ASCE's Journal of Pipeline Systems - Engineering and Practice*, 11, no. 2 (2020): 06019005.
- Meysam Najafi Ershadi, **Mehdi Eskandarzade**, Ali Kalaki, "Risk Based Inspection of Composite Components in Oil and Gas Industry", *Journal of Gas Technology*, 6, 2020. <http://jgt.irangi.org/Article/13980221179247>

- **M. Eskandarzade**, A. Tutunchi, A. Kalaki, "Fitness for Service (FFS) evaluation of the high-pressure pipelines containing local metal loss defects" *Journal of Mechanical Engineering*, 50(2), 2019. https://tumechj.tabrizu.ac.ir/article_9609_en.html
- **Eskandarzade, M.**, Faraji, G., Masoumi, A. and Kalaki, A., 2019. Optimal Design of Steppers in Single Step High Pressure Torsion (SIHPT) Process as a Novel SPD Method. *ADMT Journal*, 12(1), pp.41-50.
- Ali Kalaki, **Mehdi Eskandarzade**, Saeed Barghani, Mahdi Mohammadpour, Experimental and numerical evaluation of influencing parameters on the manufacturing of lined pipes, *International Journal of Pressure Vessels and Piping*, Volume 169, 2019. <https://doi.org/10.1016/j.ijpvp.2018.11.014>.
- **Mehdi Eskandarzade**, Ali Kalaki, Majid Safajou Jahankhanemlou, Meysam Najafi Ershadi, "Material Selection Strategy for Corrosion Control in Iranian Upstream Oil and Gas Industry" *International Conference on New Technologies in Oil, Gas and Petrochemical Industries*, University of Tehran, 2019.
- Karim Osouli, Abolfazl Tutunchi, **Mehdi Eskandarzade**, Graphene Nanosheets Reinforced Epoxy Nanocomposites; Mechanical and Electrical Properties Evaluation, *Polymer Science Series A*, 2019, 0(6):851–861, DOI: 10.1134/S0965545X18070064.
- K. Osouli-Bostanabad, A. Tutunchi, **M. Eskandarzade**, A. Kianvash "Numerical and Experimental Investigation on Boding Strength Optimization of Glass Fibers Reinforced Epoxy Composites on a Structural Steel Substrate", *Modares Mechanical Engineering*, 19(2): 2019; 387-396.
- **Mehdi Eskandarzade**, Ali Kalaki, Reza Shahrivar, The Application and Limitations of Corrosion Management Process, *Structural Integrity and Life*, Vol. 18, No 3 (2018), pp. 159 – 162. <http://divk.inovacionicentar.rs/ivk/ivk18/ivk1803-1.html>
- K. Osouli-Bostanabad, A. Tutunchi, **M. Eskandarzade**. "The influence of pre-bond surface treatment over the reliability of steel epoxy/glass composites bonded joints" *International Journal of Adhesion and Adhesives* 75: 2017; 145–154.
- **Eskandarzade, Mehdi**, Abolfazl Masoumi, Ghader Faraji, Mahdi Mohammadpour, and Xinjie Sabrina Yan. "A new designed incremental high-pressure torsion process for producing long nanostructured rod samples." *Journal of Alloys and Compounds* 695 (2017): 1539-1546.
- **Eskandarzade, Mehdi**, Abolfazl Masoumi, and Ghader Faraji. "Numerical and analytical investigation of an ultrasonic assisted ECAP process." *Journal of Theoretical and Applied Vibration and Acoustics* 2, no. 2 (2016): 167-184.
- Mollazadeh, H., R. Noruzi, and **M. Eskandarzade**. "A Study of Fatigue Properties of Steel AISI4130 (30KhMF) After Upset Welding." *Metal Science and Heat Treatment* 57, no. 1-2 (2015): 52-56.
- **Eskandarzade, M.**, Tribikram Kundu, N. Liebeaux, D. Placko, and F. Mobadersani. "Numerical simulation of electromagnetic acoustic transducers using distributed point source method." *Ultrasonics* 50, no. 6 (2010): 583-591.

ENGINEERING & INDUSTRIAL EXPERTISE

- Steel Making (Midrex, HYL, BF, VOD, RH, LF)
- Sour water corrosion mechanism codes and standards including NACE MR 0175, API 5L ANNEX H,
- Hydrogen Assisted Cracking Test standard, NACE TM-0284,
- SSC Test standard, NACE TM-0177 & ASTM G39,
- Risk Based Inspection (RBI) as per API 580/581,
- Corrosion Management as per API RP 970, EFC-64, EFC-32 and ISO 15663,
- Corrosion Control, NACE MR 0175, NACE SP 0169,

- Fitness for Service (FFS) analysis (API 579),
- Technical Inspection as per ASME B 31.3, B31.8, B31.4, API1104, API 5L, API 6A & 6D,
- Conducting Analytical and Finite Element Method (FEM) analyses and engineering calculations,
- Developing and assessing specifications, drawings inspection plans and other technical documents,
- Experience in working with RBI software of RBLX.

SOFTWARE & COMPUTER PROGRAM SKILLS

- Abaqus (FEM) Workbench, Intermediate level
- RBLX (RBI software), Corrosion Risk Assessment Software, Intermediate level
- Electronic Corrosion Engineer (ECE 5.4), Intermediate level
- Matlab, Intermediate level
- Solidworks, Professional level

PROFESSIONAL DEVELOPMENT

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| 10/11/2019 | RH Technology in clean steel making; Iron & Steel Society of Iran, Iran |
| 01/07/2018 | Piping Integrity Management System (PIMS); TWI, Iran |
| 08/08/2017 | Risk Based Inspection (RBI) course; LifeTech certified, Iran |
| 27/10/2017 | Asset Corrosion Management in the Oil and Gas industry; Tiratsoo Technical Co, Iran |
| 04/10/2012 | Ultrasonic Testing, Level I & II; ASNT certified, Iran |

ACHIEVMENTS HIGHLIGHT

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| 10/05/2019 | Outstanding Researcher, Petroleum Engineering & Development Company |
| 12/25/2019 | Honorary member of Energy Management Research Centre, UMA |
| 18/02/2016 | Registered oil and gas expert, Supreme Council of Justice |
| 03/11/2011 | Best applied researcher, Urmia University of Technology |
| 10/06/2007 | Ranked 1th student in MSc degree (1 out of 7) |
| 01/03/2007 | Membership, Iranian National Elites Foundation |
| 03/03/2007 | waiver of the Compulsory Military Service because of outstanding educational performance |
| 02/06/2001 | Ranked 150 among 550,000+ participant students in national university entrance examination |

INDUSTRIAL COURSES AS A TEACHER

- Risk based inspection techniques, Togo, 10-12/09/2020. (online course)
- Risk-Based Inspection (RBI) Training Course Based on API 580/581 using RBLX Software, Nouri Petrochemical Co., Nov-Dec 2020.

REFeree ROLES

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| 2020 | Member of scientific committee, 2nd International Conference on: New Technologies in Oil, Gas and Petrochemical Industries, University of Tehran, Tehran, Iran. |
| 2020 | Journal of Materials Science (reviewer) |
| 2020 | Journal of Mechanical Engineering (reviewer) |
| 2020 | International Journal of Pressure Vessels and Piping (reviewer) |

SCHOLARSHIP AND AWARDS

- 2017 Full Scholarship for PhD position, University of Tromsø, Norway
- 2017 Full Scholarship for PhD position, University of KU Leuven, Belgium
- 2018 Full Scholarship for PhD position, University of Loughborough University, UK
- 2018 Full Scholarship for PhD position, University of Missouri, USA
- 2018 Full scholarship for PhD position, Queensland university of Technology, Australia
- 2022 In reserve list for prestige grant for post-doc position, Newton International Fellowships, University of Warwick, UK